

SECTION I: FACTORS DRIVING CHANGE



Photo courtesy of USDA Forest Service



Photo by James Kundell, University of Georgia



Photo courtesy of Virginia Department of Forestry



Photo by Nick Cowie

Chapter 2



POPULATION AND DEMOGRAPHIC TRENDS

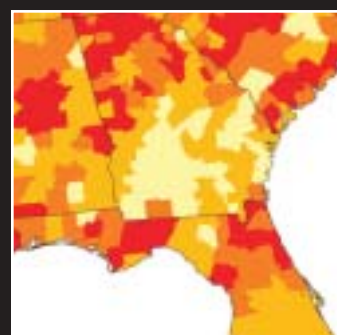
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Introduction

This chapter reports significant population, demographic, and other social trends and predicts where in the South these factors are likely to drive further urban expansion. We first examine the primary causes of population growth, which are relative birth and death rates and immigration. Next, we outline the changing social composition of the South, including age trends and evolving racial and ethnic composition. We look at growth of urban areas and its flip side, rural transition, which indeed is occurring. As an indicator of some of the economic changes occurring, we examine employment trends that are related to urban expansion. Finally, we examine various dimensions describing southerners, including rural land ownership, lifestyles, and outdoor recreational activities. ►



To illustrate the significance of the previous social demands and trends, a number of maps are presented. These maps overlay the distribution of forecast social conditions onto the locations of forest, water, wetland, and wildlife habitat resources throughout the region. These maps identify where human pressures are likely to have the greatest effects on natural resources by 2020. Data sources used to describe demands and trends include the Census of Population (U.S. Department of Commerce, Bureau of the Census 2000b), Forest Service Renewable Resources Planning Act assessment data (Cordell and others 1999), rural landowner surveys (Teasley and others 1999), Natural Resources Conservation Service data describing rural lands (U.S. Department of Agriculture, Natural Resources Conservation Service 2000), and the National Survey on Recreation and the Environment [Cordell and others, in press (b)].

Population and Other Social Trends

Table 2.1—Population of most heavily populated Southern States, the South, and the United States, 2000

Census unit	Population
	<i>Million</i>
Texas	20.9
Florida	16.0
Georgia	8.2
North Carolina	8.0
Virginia	7.1
South	91.5
United States	281.4

Source: U.S. Department of Commerce, Bureau of the Census 2000c.

The Drivers of Population Growth

Of the social changes underway, population growth will undoubtedly be the most significant in shaping the future of the South's wildland-urban interface. In April 2000, the population of the United States was estimated to be 281,421,906. Of that number, 91,486,129 lived in the 13-State region from Virginia to Texas (table 2.1) (U.S. Department of Commerce, Bureau of the Census 2000c). Between April 1, 1990, and April 1, 2000, this region's population grew 13.9 percent and now accounts for 32.5 percent of the national total. The South's share is increasing relative to shares of other regions.

The three fundamental drivers of population change are births, deaths, and net immigration rates. The current birth rate in the South is 16.5 per 1,000-population per year, which is just below the national average for the 48 contiguous States. Across a wide band of counties stretching across the South from coastal and Piedmont North Carolina to Louisiana and coastal Texas, however, birth rates are well above the region-wide and national rates. Some rates reach 30 to 40 per 1,000 per year. The death rate across the South, at 10.2 per 1,000 per year, is just at the national average. In Florida and in parts of Mississippi and Arkansas, death rates exceed this region-wide average, reaching 15 to 25 deaths per 1,000 per year in many counties. The South's birth rate of 16.5, being substantially higher than its death rate of 10.2, results in a net population gain (called a "natural increase") of 6.3 people per 1,000-population per year. At this rate, around 600,000 people are added to the South's resident population per year through natural increases, adding tremendous pressures for urban expansion and development to accommodate needs for new housing, retail outlets, and transportation.

Immigration from other countries and migration from other regions to the South are additional sources of population growth. They exceed the natural increases from net birth rate. Between 1981 and 1990, 7.3 million immigrants moved into the United States from other parts of the world. Exiting emigrants during this same period numbered 1.6 million. Thus, net immigration was just over 5.7 million. The statistics account only for legal immigration (U.S. Department of Commerce, Bureau of the Census 1992). Illegal immigration is believed to be much larger—over 1 million per year by some estimates. As in the Nation as a whole, net immigration to the South has continued to rise dramatically decade by decade.

“One of the things that concerns me is the changing demographics Let’s talk about the Houston area. By the year 2030, the population is supposed to double.” Texas

Migration to the South from other regions of this country is highly significant. In 1981, 1.47 million people moved into this region from other parts of the United States, while approximately 1 million moved out. The net increase was 470,000 (U.S. Department of Commerce, Bureau of the Census 2000a). People moving into the South from abroad that year totaled 401,000 making a legal net gain of 871,000. In 1998, net internal migration totaled 271,000, while movers from abroad totaled 544,000. The South’s net gain, excluding illegal immigration, was 815,000. That total was greater than the totals across all other U.S. regions combined. With migration pressures of this magnitude, mostly to already burgeoning metropolitan areas like Houston, TX, Atlanta, GA, and Miami, FL, former rural areas and forests are being converted to urban interface zones at unprecedented rates.

Social Composition, Age, and Ethnicity

Like population growth, aging is a major component of social change in the United States and in the South. Aging is likely to have profound effects on future recreation, development, and agricultural demands on our forests and other rural lands, especially those in attractive retirement destinations (**fig. 2.1**). The median age of the U.S. population has been rising steadily from 18.9 years in 1850 to 32.8 years in 1990. In the South, median ages among the States range from a low of just under 34.5 in Texas to a high of over 42 in Florida. In all the States, median age is expected to rise, with Virginia, Alabama, Mississippi, and Arkansas leading in this increase. A dominant reason for the rising median age of the region’s population is rising life expectancy due to better diets and medical care. For people born in 1950, average life expectancy is just under 70 years (Barrick and Zayatz 1996). For people born in 2000, life expectancy is around 74 for males and just over 80 for females.



Photo courtesy of Virginia Department of Forestry

Figure 2.1
Forested areas in the wildland-urban interface are attractive as retirement destinations across the South.

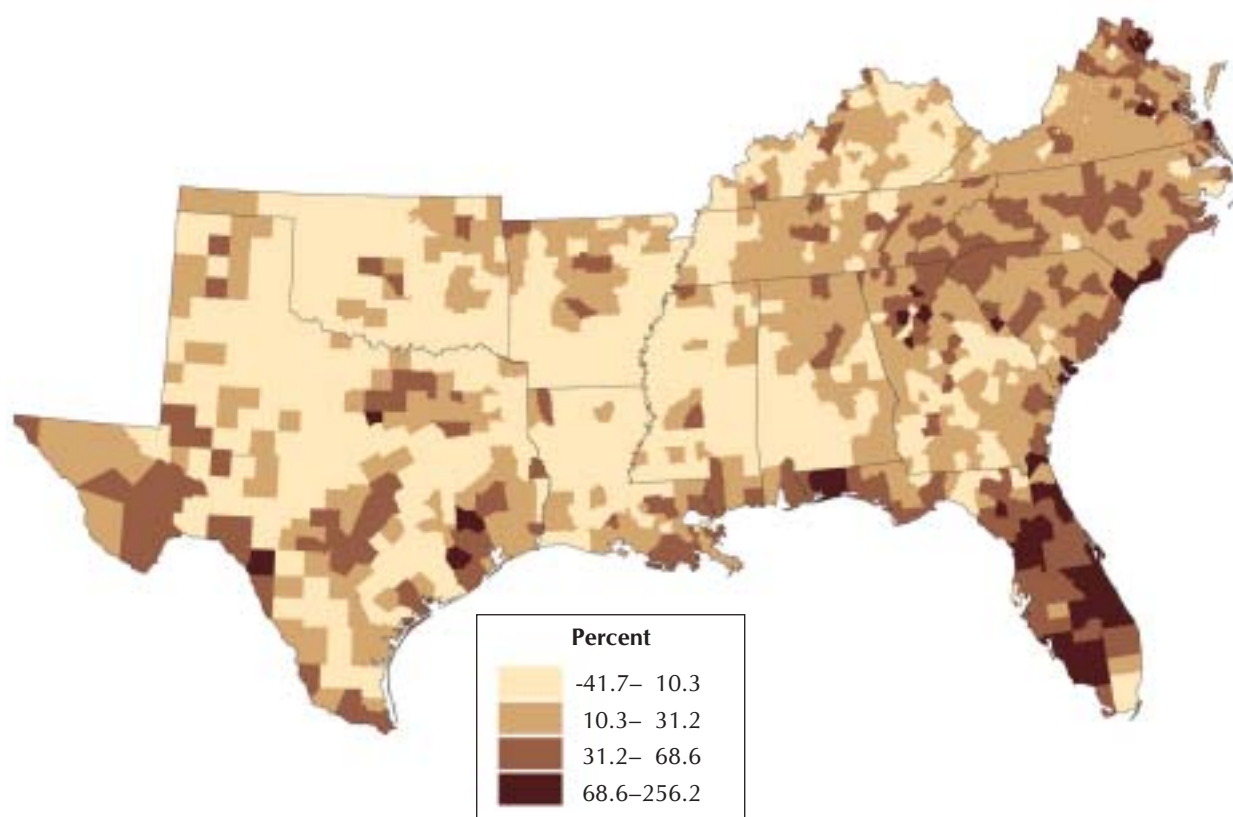
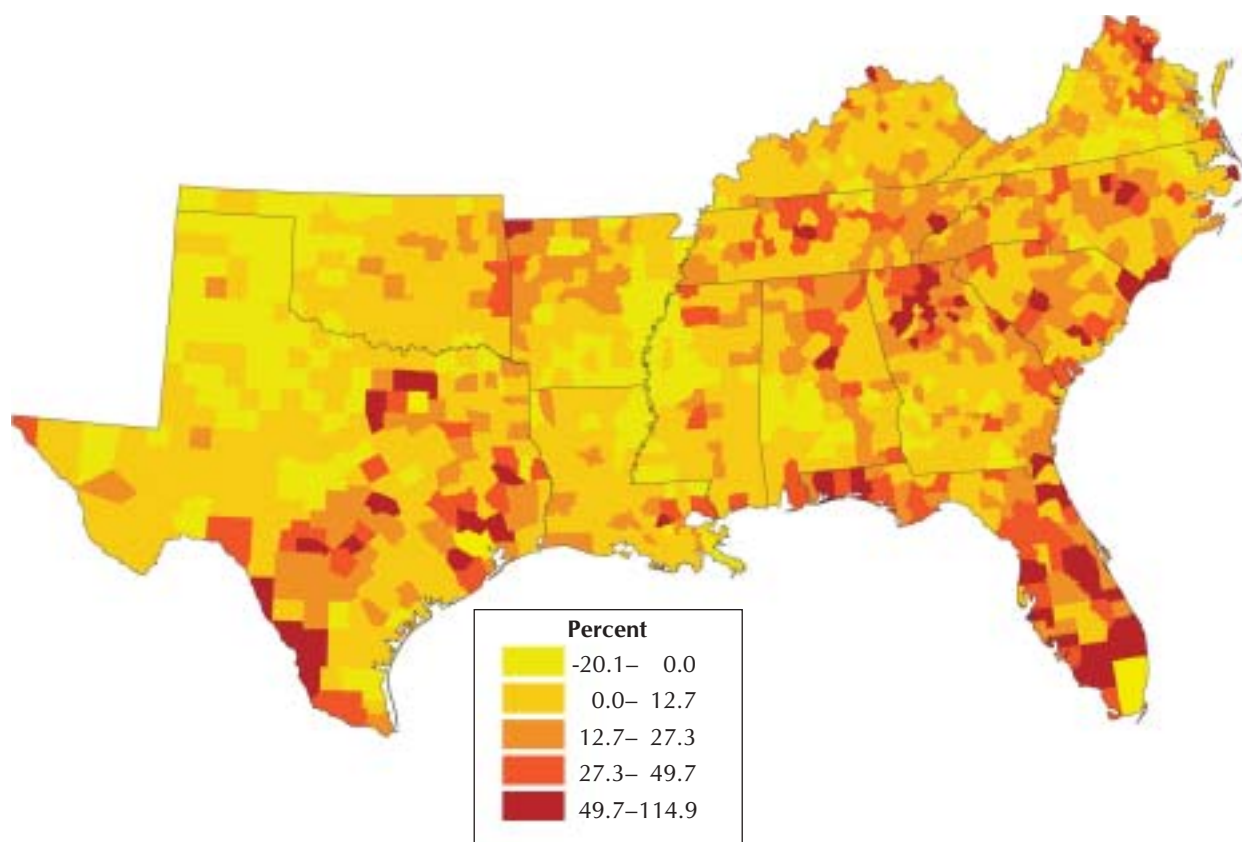


Figure 2.2
Distribution among counties of change
in U.S. population 65 and older,
1980-90. (Source: Woods and Poole
Economics, Incorporated 1997.)

A highly significant outcome of population aging is the unprecedented increase in number of retirees. **Figure 2.2** shows changes in numbers of residents over 65 years old between 1980 and 1990 across the counties of the South. The overall regional increase was 25.7 percent. The most rapid increases were in most of Florida, along the Atlantic coast, down the Southern Appalachians to Atlanta, along the gulf coast, and in eastern Texas. Over the region, the percentage of the population age 65 and over is projected to continue to rise from about 12.5 percent in 2000 to over 17 percent by 2020 (Woods and Poole Economics, Incorporated 1997). This increase is likely to have profound effects on forest ecosystems. It means continued development of retirement communities, second homes, and recreation facilities like golf courses, all of which lead to the creation of new interface areas. It also means more potential for interactions between interface residents and forest management practices, such as fire, recreation, and timber management (Marcin 1993).

“A lot of our population growth is part-time or seasonal, but their impact is felt all year round.” Florida

Increasing ethnic diversity is another primary component of social change in the South. The makeup of the population is shifting rapidly. In the 1990s, non-Hispanic Whites made up approximately 72.4 percent of the region-wide population. Of minority populations, Hispanic residents made up 8.9 percent, Blacks



made up 16.7 percent, and Asian and other races made up just over 2 percent. The trends now are similar in the South to those in the rest of the United States. Non-Hispanic Whites are steadily becoming a smaller percentage of the total population. Research has shown that Whites, Blacks, Hispanics, Asians, and others differ in how each uses and values southern forests and other natural resources [Cordell and others, in press (a)]. Resulting changes in collective public positions on natural resource management and protection will likely end up being the social trend with the greatest impact on how we collectively view and use forests.

Figure 2.3
Distribution of projected change in the South's population, 2000-20. (Source: Woods and Poole Economics, Incorporated 1997.)

Population Projections

Between 2000 and 2020, the South's population is projected to increase another 23.8 million, reaching almost 114 million people by the close of those two decades. **Figure 2.3** shows projected distribution of percentage population growth over counties of the South between 2000 and 2020. Over the region, the percentage of the population age 65 and over is projected to increase from about 12.5 percent in 2000 to over 17 percent by 2020 (Woods and Poole Economics, Incorporated 1997). Ethnic composition is shifting rapidly in this region. By 2020, Hispanics are expected to account for about 16.2 percent of the population, Blacks 19.5 percent, and Asians and others around 3 percent (Woods and Poole Economics, Incorporated 1997). Non-Hispanic Whites, as a proportion of the population, will drop to about 61 percent by 2020 and just over 50 percent by 2050.

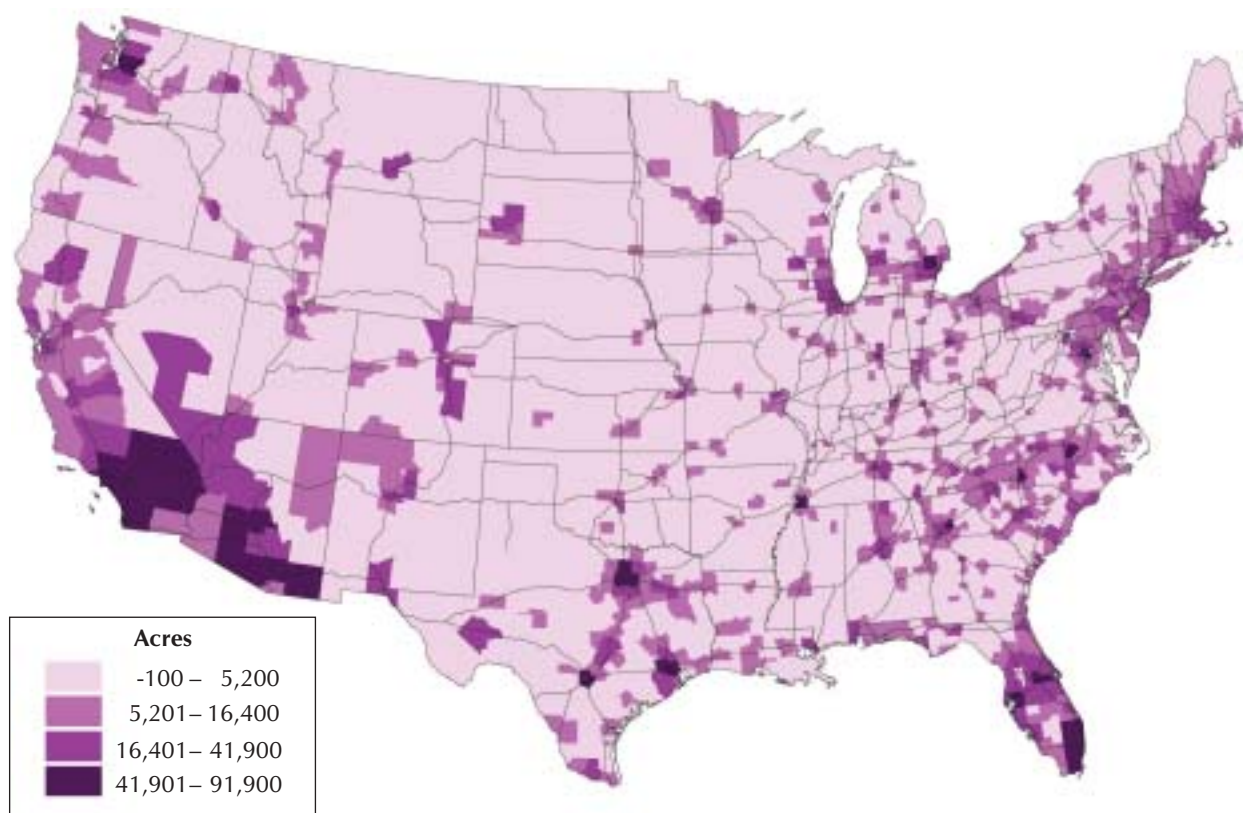


Figure 2.4
Change in acreage from rural to urban
across the United States, 1982–92.
(Source: Woods and Poole Economics,
Incorporated 1997.)

Urban Growth

In the South and the Nation, population growth is primarily in urban areas. In 1790 when the first U.S. census of population was done, only 5 percent of the country's population lived in the few large cities of that time. By 1920, the population balance between rural and urban had shifted, and the population became predominantly an urban one. By 1990, 75 percent of the people in the United States lived in urban areas. Since then, metropolitan counties have accounted for about 82 percent of all growth, even though they make up only 18 percent of the total land base (U.S. Department of Commerce, Bureau of the Census 1997). Today, over 80 percent of the U.S. population is urban, and well over 2 million more urban residents are added each year.

“Landscapes just change almost overnight before you can even react to anything . . .” Mississippi

The burgeoning urban population drives new development, constantly expanding the wildland-urban interface. Urban and related development is occurring at unprecedented rates in the United States and the South. Between 1992 and 1997, nearly 16 million acres of formerly rural land across the Nation were converted to developed urban land uses. At this rate, over 3 million acres of urban development are being added annually. Notable among southern counties facing

Table 2.2—Changes and projections in urban population and population density in the six largest metropolitan areas and the South, 1995–2020

Region	Population			Population density		
	1995	2020	1995–2020	1995	2020	Change
				<i>Per square mile</i>		<i>Percent</i>
Dallas-Ft. Worth	4,449,877	6,625,820	2,175,943	488.75	727.74	48.9
Atlanta	3,431,987	5,254,118	1,822,131	560.21	857.65	53.1
Houston	3,710,847	5,494,718	1,783,871	626.72	927.99	48.1
Tampa-St. Petersburg	2,180,484	3,339,119	1,158,635	853.59	1,307.15	53.1
Miami	2,031,337	2,403,171	371,834	1,044.55	1,235.75	18.3
Memphis	1,068,895	1,341,475	272,580	355.40	446.03	25.5
South	60,750,243	83,968,681	23,218,438	283.14	391.35	38.2

Source: Woods and Poole Economics, Incorporated 1997.

high rates of urbanization between 1982 and 1992 were those along the coast of South Carolina, Georgia, and Florida; counties in the highlands of Virginia and nearby West Virginia; counties in eastern Kentucky and eastern Tennessee; and counties in southern Texas (fig. 2.4). A sizeable number of counties in the South were adding urban development at rates of 21 to almost 62 percent during this 10-year period. Of the 20 counties in the country with the greatest number of acres converted to urban uses between 1982 and 1992, 4 were in Texas, 5 were in Florida, 2 were in North Carolina, and 1 was in Georgia. Thus, 12 of the top 20 were in the South. By 1997, when the latest National Resources Inventory (NRI) was completed, the annual rate of urban land development had doubled (U.S. Department of Agriculture 1994). Nationally, total acreage of land developed for urban uses between 1992 and 1997 was greatest in 10 States. Six of those States were in the South, and in each of those Southern States, more than 500,000 acres had been converted to urban development. Topping the list nationally was Texas with 1.2 million acres. Other States on this list were Georgia with 1 million, Florida with 945,000, North Carolina with 782,000, Tennessee with 612,000, and South Carolina with 540,000.

Urban Population Projections

The urban population of the United States is predicted to grow by 18.8 percent between 2000 and 2020, compared to 12.4 percent growth in rural counties. **Table 2.2** provides projections for the South and its six largest metropolitan areas. The predicted growth of 23.2 million new southern urban residents between 1995 and 2020 will exceed the combined growth of the North and Pacific coast regions during this period. While the urban areas of the North will continue to be the most densely populated among U.S. regions, at over 540 people per square mile, population density will be rising faster in the South, reaching 391 persons per square mile by 2020. Except for cities in Florida, population growth in southern cities is driven less by natural and cultural amenities than it is by economic opportunities and employment. Florida cities are growing largely because they are high-amenity retirement destinations and because of massive Hispanic immigration. As

urban expansion accelerates and urban population growth continues, the region is likely to see a moderate shift in public attitude away from protection of forested interface lands. There are also likely to be shifts in the way the future population uses forests and other natural lands.

Rural Transition

Seventy-six percent of the Nation's counties (2,305) are classified by the Federal Government as rural. While rural counties account for 83 percent of the Nation's land, they account for < 20 percent of its population (Rural Policy Research Institute 1999). Between 1980 and 1990, a number of counties in the South experienced population losses. Included were counties in northern Texas and parts of Arkansas, Mississippi, Alabama, Georgia, West Virginia, and Kentucky.

In most rural counties, however, population grew in the 1980s, particularly in parts of Texas and Florida. During this decade, the South experienced a 3.1-percent rate of rural population growth. In the 1990s, however, the population of rural counties in the South grew 7.5 percent. In some, growth exceeded 100 percent. Such rapid growth is expected to continue along sections of the Atlantic and gulf coasts. On average, populations of southern rural counties are expected to grow by 11.5 percent. Over the same period, population growth rates in rural counties are expected to be 23.3 percent in Pacific Coast States and 8.0 percent in the North. In terms of population density, the rural South will gain more than any other region of the country (4.2 people per square mile). Many of these rapidly growing rural areas are connected one to the other, or to nearby metropolitan areas, by interstate highways. This interstate linkage demonstrates the influence that Federal policies, such as the creation of the National Interstate Highway System, can have in opening land previously in agriculture and forests to growth and development. Such development, of course, will further expand the wildland-urban interface (see chapter 4).

Nationally, between 1982 and 1992, around 13.3 million acres of rural land were converted to urban and other built-up uses. This total included 6.5 million acres in the South, where more rural acreage was converted than in any other region. Expressed as a percentage change rate, this 33-percent, 10-year pace of land conversion indicates a greater-than-national rate of expansion of the South's wildland-urban interface. The NRI data for 1992–97 showed that loss of rural land had accelerated in every State in the Nation. The highest acreage losses between 1992 and 1997 occurred in Texas (1.14 million), Georgia (1.05 million), Florida (0.92 million), and North Carolina (0.75 million). Large-scale conversion to urban development also occurred in Virginia, Kentucky, and Georgia. Of the top 20 counties in rural land area converted, 3 were in Virginia, 2 in Kentucky, and 2 in Texas. Comparing the ratio of rural area converted to growth of population among regions revealed that the South had the highest annual ratio at 3.2 converted acres per added rural resident. This ratio indicates the considerable impact that new residents have on land development and, subsequently, forest ecosystems (see chapter 5).

The Shifting Economy

Shifts in employment among sectors of the economy help to identify changing demand pressures on natural resources, changes in industry makeup, and transitions in the ways people make their living and conduct their lives. Many of the



Photo courtesy of USDA Forest Service

Figure 2.5
Greater employment in construction indicates greater pressures to expand the wildland-urban interface.

employment shifts are closely linked to the transition of the South from a rural to an urban region. People working in urban services, retail stores, or other urban jobs usually view the role and importance of forests and other natural resources differently from their rural neighbors.

Many of the significant shifts that have been occurring over the past 20 years among sectors of the South's economy have been driven by a continuing transition from a rural to an urban society. For more than 20 years, employment in farming, as a share of total employment, has been in decline. In large part, this decline has been due to increased large-scale corporate farming and associated upscaling of technology, mechanization, and use of chemicals. Unable to compete, small farms have all but disappeared. Along with them have gone many of the low-technology, labor-intensive farming practices of the past. From 1975 to 1995, the percentage of people employed in farming in the South dropped by about 7 percent. By the late 1990s, farming was an even smaller proportion of the region's workforce, and by 2020, only 12 to 13 percent of the South's workers are expected to be employed in farming. While employment in farming has been declining, employment in the agricultural service industry, which distributes such commodities as fertilizers, insecticides, and farm equipment, has been increasing. Between 1975 and 1995, the percentage of southern workers employed in agricultural services had roughly doubled. Unlike the growth in agricultural services, jobs in the mining, forestry, and fisheries industries are expected to remain somewhat stable through to 2020.

Greater employment in construction indicates greater pressures to expand the wildland-urban interface (**fig. 2.5**). There was a significant increase in the region's construction employment during the late 1970s, from around 5 percent of the labor force in 1975 to over 5.5 percent in 1980. Since then, construction has accounted for between 5.5 and 5.7 percent of workers. In 1975, about 13 percent of workers were employed in retail trades. Since then, the region-wide proportion has risen significantly. In southern metropolitan areas, such as Atlanta, Charlotte, Houston, Dallas, and Miami, growth in retail employment has been especially significant. As urban population has grown in these and other cities, so too has the need for retail trade workers in stores, shopping malls, and associated manufacturing plants. In 1995, retail trade employment accounted for between 15 and 18 percent of all employment. The service sector is another of the South's economic sectors with direct linkages to urban expansion. By 1995, service workers, mostly

working in urban settings, made up just over 20 percent of the region's labor force.

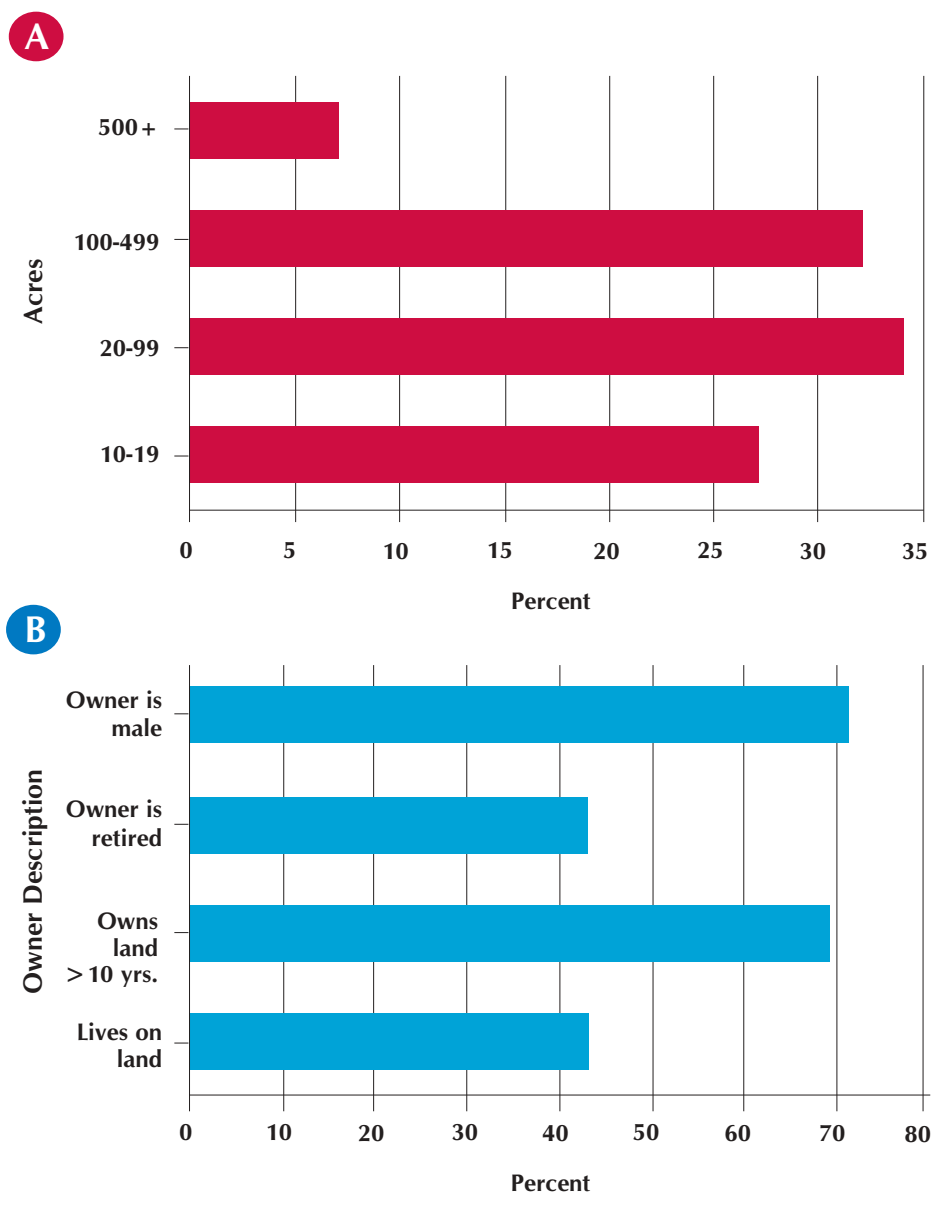
Percentage of workers employed in farming is projected to continue to decline through 2020. This trend will hold not only in the South, but also for the Nation as a whole (Woods and Poole Economics, Incorporated 1997). Percentages of employment in agricultural services and construction should remain stable at their 1995 levels. Percentages of jobs in services and retail trade, however, will continue to rise. By 2020, a 1- to 3-percent increase in the service sector workforce is expected. Overall, with rapid urban expansion, persistent population growth, and rising numbers of high-income retirees, the South's economy is forecast to continue its vigorous growth and further transition from farming and manufacturing to service, retail, technology, and other urban industries. That growth will mean more development of forest land in the wildland-urban interface, and this development in turn will stimulate even more economic growth.

As economic growth continues, incomes will be driven higher. Projections indicate an average increase for both the Nation and the South of about 27 percent in real per capita income (after adjusting for expected cost-of-living inflation) during the first 20 years of the 21st century. Counties whose per capita income is predicted to grow at more than 30 percent from 2000 to 2020 are scattered across the South, but most are concentrated in northern North Carolina, central Georgia and Alabama, Florida, and central Texas. Growing per capita income will result in more households being in the highest income brackets. Nationally in 1995, just over 2 percent of all households had an income of over \$100,000 per year. In the South, the areas where people earning this much per year are likely to increase most rapidly include coastal South Carolina and south Florida. These are among the areas of the South where the greatest levels of urban expansion also are occurring.

Rural Land Ownership

Across Southern States, approximately 432 million acres of rural land is in corporate and individual private tracts, about 78 percent of the region's total area. Texas, by far, has the greatest private total—almost 147 million acres. South Carolina has the least, about 15 million acres. Private land area in the rest of the Southern States ranges from 19 million acres in Virginia to 38 million acres in Oklahoma (U.S. Department of Agriculture, Natural Resources Conservation Service 2000). Among the different categories of ownership in this region, individual ownership is the primary type (**figs. 2.6A, 2.6B**).

The characteristics of rural landowners are important to the status and future of the rural landscape and the character and effects of the advancing wildland-urban interface. Population growth, changes in ethnic diversity, conversion of rural land to urban uses, shifts in the economy and sectors in which people are employed, and many other social changes occurring in the South influence rural land ownership. Increasingly, rural land is being converted from small farms to urban worker and retiree residences. This conversion usually results in tract subdivision and greater fragmentation of the rural landscape. At the same time, the number of absentee versus resident landowners is increasing. Leading motivations for absentee owners are recreation and speculation. Residential development and tract fragmentation are associated with urban expansion. However, absentee owners motivated by the desire to have a rural retreat can act as a buffer to such development. It is unclear what the land ownership patterns of the future will be. The majority of current owners are in their fifties or older, and their land will pass into other hands in the not-too-distant future (Sampson and DeCoster 2000). Important

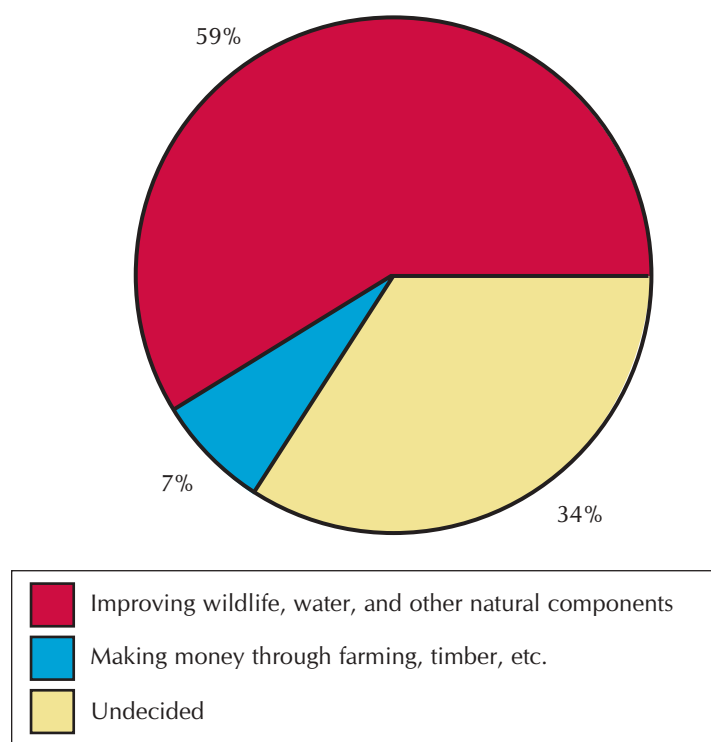
**Figure 2.6**

(A) Percentage of individual owners by size of tract owned and (B) percentage of landowners by owner description.

changes will likely result from these property transfers. The implications of ownership changes and other trends on public policy, forest ecology, forest management, and social systems are discussed in more depth throughout this Assessment.

The estimated 4 to 5 million individual private owners in the South have a variety of reasons for possessing rural land. Knowing these reasons provides critical insights into more effectively working with owners. Some prominent reasons for owning land are: living in a rural environment, enjoying personal green space, building an estate for heirs, and providing wildlife habitat (Teasley and others 1999). Predicting trends in the interface requires an understanding of what owners want to emphasize in the use of their land (**fig. 2.7**). Study results indicate that owners care about the natural condition of their land. Management practices employed to improve the natural condition varied among owners from no efforts to a number of purposeful practices. The more prominent purposeful practices included prescribed burning, improving wildlife habitat, planting trees, harvesting

Figure 2.7
Percentage of owners by land
management emphasis.



timber, and developing ponds or lakes. Just over 30 percent of owners have undertaken some sort of wetland conservation measure.

Such findings suggest a significant conservation ethic among most of the South's private landowners. But there is also potential for a great deal of conflict between this conservation ethic and more traditional views that emphasize economic utility. Increasing fragmentation of tracts suggests a need for neighbors to plan together and set common objectives. Working together, landowners can address issues like the buildup of forest fuel, which can lead to catastrophic interface fires. There is obviously a significant opportunity for State forestry agencies and others to focus more on education and providing incentives for better management of private forest land.

With accelerating urban expansion, private owners increasingly are faced with public use problems, such as littering, illegal hunting, dumping, and property damage. Landowners often post their properties (41 percent of landowners do) to limit these unwanted problems (**fig. 2.8**). Posting reduces use of private land and puts greater recreation and wildlife management pressures on public land.

Twenty percent of owners have definite plans to sell all or part of their land in the future. Thirteen percent plan to add acreage. Fifty-one percent have no definite plans. As urbanization continues across the South, owner plans may shift from their former, historical patterns. Sixteen percent of southern owners report that their land is now next to or only a short walk from a residential subdivision. Thus, a vast proportion of the southern landscape is subject to increasing human influences and interface expansion. Pressures such as rising property taxes, encroaching development, and others will surely continue to grow.



Figure 2.8
Increasingly, southern landowners are
posting their properties as a way of
limiting problems, such as littering and
illegal hunting.

Photo courtesy of USDA Forest Service

Table 2.3—Percentage of residents 16 years or older in 5 regions of the United States who regularly participate in 20 lifestyle activities, 2000

Activity	South	North	Great Plains	Rocky Mtns.	Pacific coast
	----- Percent -----				
Belong to environmental group	9.0	7.3	8.6	8.9	8.0
Have a vacation home	15.1	15.1	11.3	15.3	15.5
Commute > 45 minutes	16.6	16.1	12.6	11.8	14.9
Run own business	17.5	14.5	15.4	23.6	21.0
Youth volunteer	20.4	19.9	20.2	19.8	17.3
Play stock market	23.0	24.2	20.1	20.4	21.8
Creative arts	23.9	27.2	23.9	25.6	29.0
Read nature magazines	27.1	25.1	27.6	23.6	26.1
Crafts	27.3	27.2	27.8	32.3	30.4
Collect things	29.8	26.1	26.7	24.3	25.6
Grow a garden	30.6	32.8	34.5	30.4	33.6
Exercise	41.2	40.6	39.4	45.4	46.7
Raise kids	47.0	44.6	46.2	42.2	44.3
Follow sports	48.9	44.3	43.5	43.5	45.3
Eat out	50.6	37.9	43.0	44.7	44.6
Use computer at home	51.8	56.0	50.5	55.6	58.7
Recycle	52.4	75.9	64.7	54.3	77.1
Attend church	57.3	46.5	49.7	44.1	36.0
Care for pets	59.5	56.7	60.3	62.0	60.3
Cook at home	76.9	79.9	80.4	84.0	84.5

Source: Cordell and others, in press (b).

Lifestyles

Demographics, economics, and land ownership information tell only a part of the story of our lives. The ways in which we conduct our lives—our lifestyles—are equally telling. Knowing lifestyles, recreation activities, and choices people make provides insights into what people consider important. Knowing what is important in people's lives translates directly into a better understanding of how they perceive natural areas. More importantly, that knowledge suggests pathways for interface education, outreach, and involvement programs.

Our research shows that southerners are not a great deal different from people in the rest of the country. Our analysis of the lifestyles of southerners indicates that they are more like, than unlike, people who live in other regions. **Table 2.3** reports percentages of residents 16 years or older in 5 regions of the country who regularly participate in 20 lifestyle activities. The source of data is the National Survey on Recreation and the Environment [Cordell and others, in press (b)]. These

activities (not including outdoor recreation, which is presented later) are ordered from the least to the most frequently pursued. Least frequently mentioned were belonging to an environmental group, running one's own business, owning a vacation home, and daily commuting to work more than 45 minutes one way. Most frequently mentioned lifestyle activities include using the Internet and the computer at home, recycling home waste materials, attending church, and caring for pets.

Outdoor Recreation Activities

A highly significant aspect of southerners' lifestyles and how they relate to forested lands is participation in outdoor recreation (Cordell and others 1999). For many, the only direct contact with the South's forests and wildlands is through outdoor recreation. As with other lifestyle activities, knowing which recreation activities people choose gives great insight into their interests, whereabouts, and paths for communication. Recreation and leisure are among the drivers of contemporary rural land settlement and development patterns. Living in the country, having land to recreate on, having a vacation home, and taking trips to tourist destinations are among the reasons people move and travel to rural areas. Examples of tourist destinations include ski resorts in the Southern Appalachians, golf resorts in coastal South Carolina, and camping and lodge resorts in highland areas throughout the region. Over time, these tourism destinations become the leading edge of the wildland-urban interface.

More than 95 percent of southerners participate to some extent in one or more outdoor recreation activities at some time during a typical year. **Table 2.4** displays percentages of the South's and of the United States' populations that participate in the listed recreation activities. By far the most popular activities are those that are relatively easy to do, require little monetary outlay or skill, and are readily accessible. These most popular activities include walking, going to outdoor family gatherings, visiting nature centers, sightseeing, and driving for pleasure. Activities with an emphasis on seeing and learning are prominent among the top one-third of activities in table 2.4. Trail activities, such as hiking, backpacking, and horseback riding, are among those in the middle one-third. More specialized, physically demanding, and skill- or equipment-intensive activities are among those with the lowest participation rates by southerners. In this group are activities occurring in snow and ice settings, which are prominent only at high elevations in the South.

Table 2.4—Recreation activity participation in the South and the United States, 2000

Activity	South	United States
<i>Percent of population</i>		
Walk for pleasure	83.08	84.85
Family gathering outdoors	71.91	73.85
Visit nature centers	53.69	59.27
Sightseeing	53.04	53.98
Drive for pleasure	52.77	53.66
Picnic	49.73	57.34
View/photograph natural scenery	46.56	55.09
Visit historic sites	43.83	48.71
Swim in streams and lakes	42.35	44.38
View/photograph wildlife	36.83	41.05
View/photograph flowers, etc.	36.68	41.19
Visit the beach	36.45	39.96
All nature viewing/photography	35.92	41.68
Bicycling	35.03	41.63
Freshwater fishing	33.40	27.80
Visit a wilderness	31.11	35.45
View or photograph birds	27.47	30.07
Day hiking	27.43	36.48
Visit waterside besides beach	27.07	27.09
Gather mushrooms, berries, etc.	25.54	27.97
Motorboating	24.86	23.90
View or photograph fish	21.39	21.68
Outdoor team sports	21.33	22.51
Developed camping	20.70	26.83
Visit prehistoric sites	19.53	21.30
Drive off-road	17.81	17.01
Mountain biking	16.15	23.39
Saltwater fishing	13.82	7.90
Primitive camping	13.05	16.18
Hunting	12.77	10.54
Horseback riding	10.59	9.99
Jet skiing	10.03	8.85
Rafting	9.16	9.95
Water-skiing	8.72	7.92
Backpacking	8.61	12.15
Canoeing	7.51	10.23
Snorkeling	6.13	6.95
Downhill skiing	4.37	10.26
Sailing	3.99	5.43
Rowing	3.31	4.99
Scuba diving	2.14	1.77
Snowboarding	2.02	5.83
Kayaking	1.82	3.51
Surfing	1.48	1.52
Snowmobiling	1.36	7.06
Cross-country skiing	1.22	5.03
Windsurfing	.75	.85

Source: Cordell and others, in press (b).



Photo by Larry Korhaack, University of Florida

Figure 2.9

Birdwatching is one of the fastest growing outdoor recreation activities in the South with a growth rate of 13 percent per year.

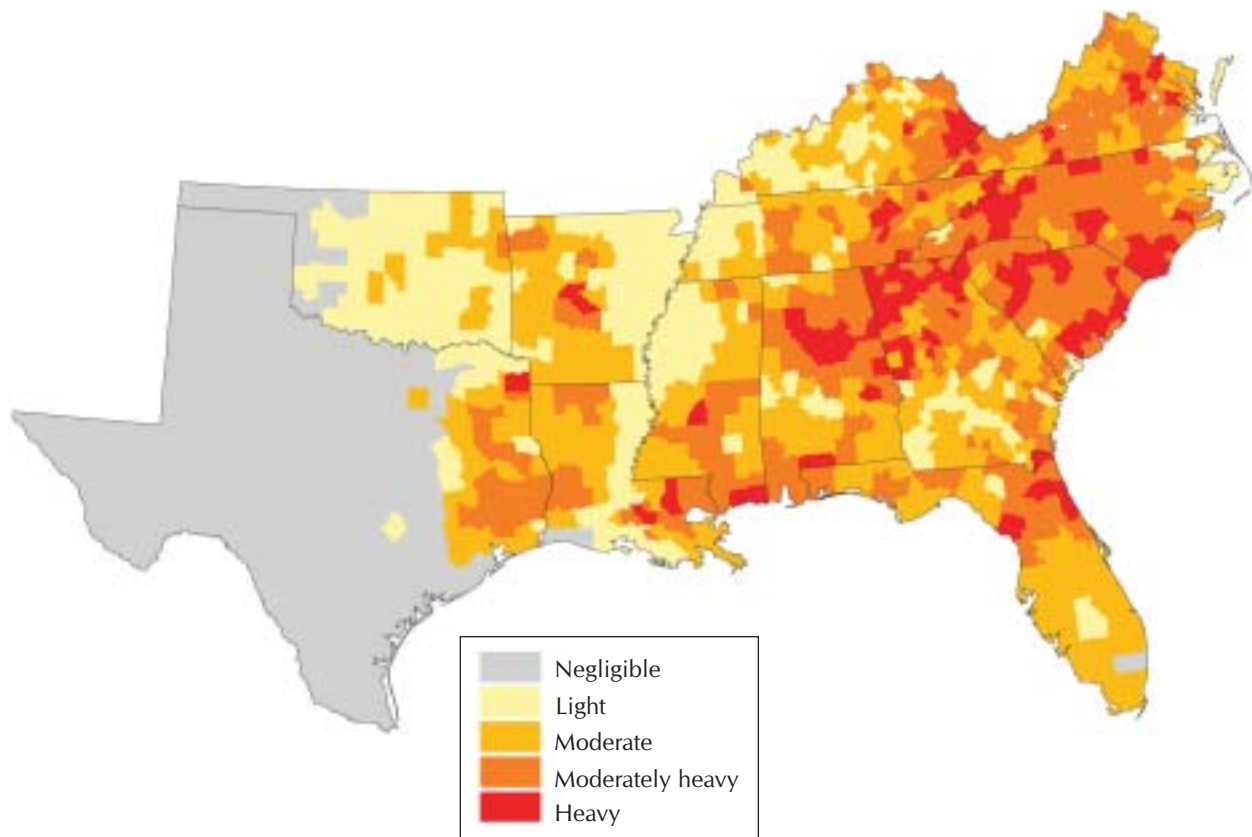
Approximately 69 million people 16 years old or older across the region participate in outdoor recreation to some extent. With this population growing at a rate of 1.3 to 1.4 percent per year, growth of outdoor recreation demand is virtually assured well into the future. What is most interesting, however, is that the growth rate among some activities is much higher than the population growth rate. Activities that are growing fastest are birdwatching (13.1 percent per year) (**fig. 2.9**), hiking on trails (10.9 percent), backpacking (9.2 percent), walking for pleasure (5.1 percent), off-road driving (5.0 percent), primitive camping (4.6 percent), developed camping (4.2 percent), and swimming in rivers, lakes, or the ocean (3.6 percent). Many of these activities occur in mostly rural, forested environments. Urban encroachment on rural forested environments, therefore, can have dramatic effects on opportunities for such activities. Availability of outdoor opportunities is an important lead indicator of demand pressures leading to growth of the wildland-urban interface in future years. This also results in direct pressures on natural resources and how they are managed (see chapters 5 and 6).

Recreation Demand Projections

Using three common outdoor activities as indicators—fishing, hiking, and camping—we examine projections developed to predict growth in number of days of participation for the South to 2020 (Bowker and others 1999). By 2020, days people spend are projected to rise 19 percent for fishing, 48 percent for hiking, and 68 percent for developed camping. Days of participation are forecast to grow faster than the population for about 60 percent of all activities tracked. Recreation demand growth, therefore, will add to urban expansion and to tourist development in rural parts of the region.

The Emerging Wildland-Urban Interface

This section presents the results of a geospatial analysis of land cover characteristics, population growth, and nonagricultural economic development. Cover characteristics include existing forest, public land, water and wetland, and wildlife habitat in southern counties. Projected population growth is in persons per square mile. Nonagricultural employment is used as an indicator of economic development. Conditions are projected to the year 2020. Details of data sources and data treatment can be found in Cordell and Overdevest (2001). The results of this analysis are summarized in six maps as follows: (1) forests and population growth, (2) forests and economic development, (3) forests and recreation demand growth, (4) public land and population growth, (5) water and wetlands and population growth, and (6) wildlife habitat and population growth. These maps collectively reflect the interdisciplinary nature of wildland-urban interface issues discussed throughout this Assessment.



Forests and Population Growth

Population is projected to grow across most counties of the South to 2020 and beyond. Growth will occur in many of the South's counties where forest land is still relatively abundant. Future growth in population will create a variety of pressures on forests, including demands for development, forest gathering, timber harvesting, recreation, and road building. In **figure 2.10**, the clusters of counties where these population pressures will be greatest are highlighted as "population hot spots." They include the Southern Appalachians, northcentral Alabama, the Piedmont of North and South Carolina, and coastal North and South Carolina. Other scattered hot spots of population pressure include northeastern Virginia and coastal Florida, Alabama, and Louisiana.

Figure 2.10
Projected ambient population pressures on forest, 2020. Population hot spots are where pressures on forests are expected to be heaviest.

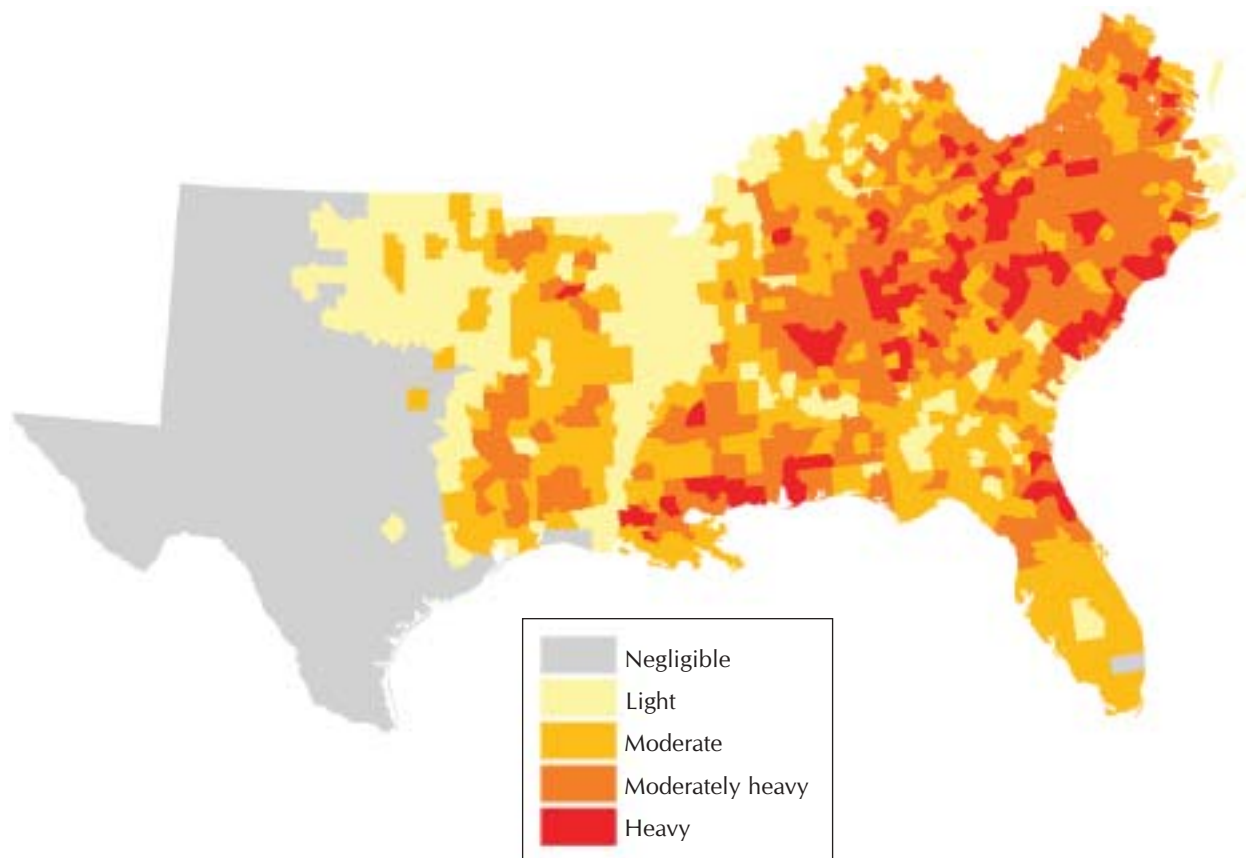
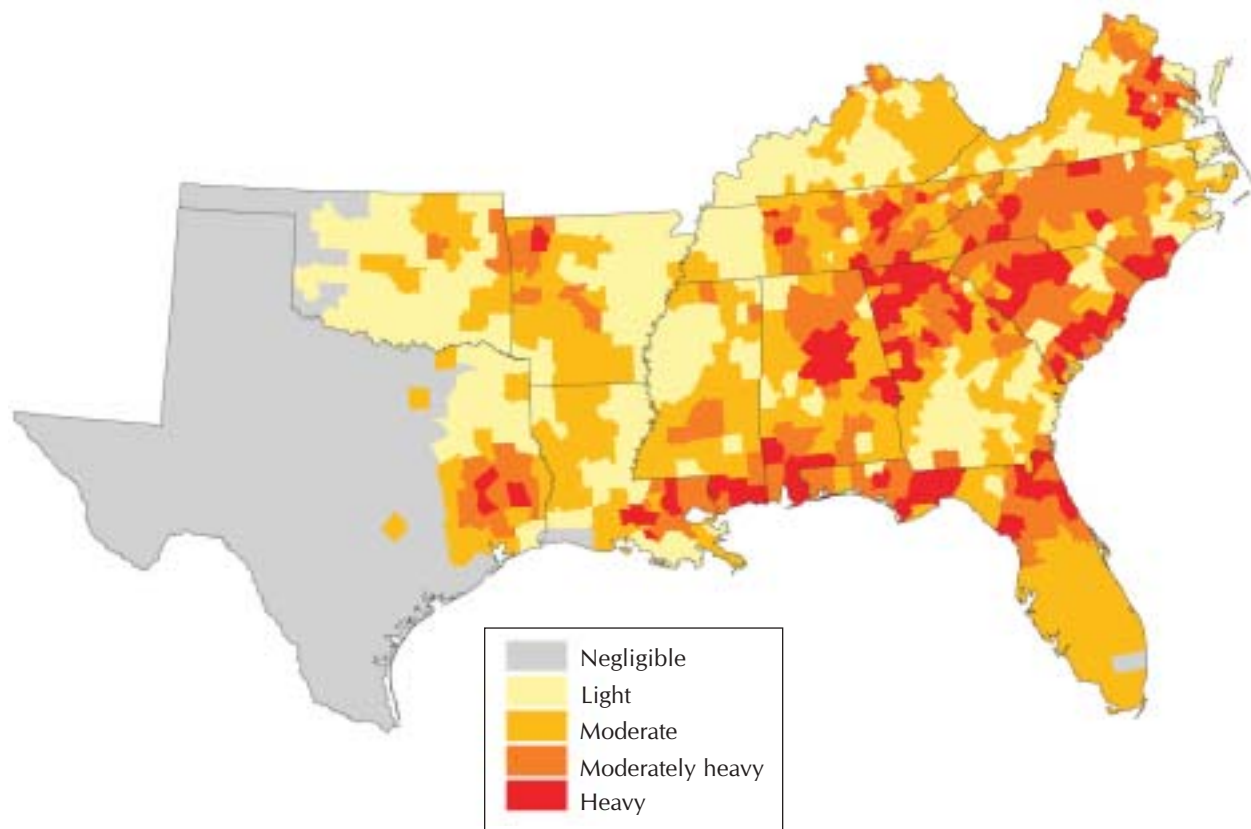


Figure 2.11
Projected ambient nonagricultural
pressures on forest, 2020.

Forests and Economic Development

Figure 2.11 displays projected nonagricultural economic development in relation to locations with relatively abundant forest cover. The spatial pattern of coincidence between likely future economic development and forest cover is very similar to population growth and is spatially dependent on location of major highways, especially interstate highways. Differences include more pressure along the gulf coast of southern Mississippi and Louisiana.



Forests and Recreation Demand Growth

Growth in recreation demand puts direct pressures on forest land in the South (**fig. 2.12**) (Cordell and Tarrant, in press). Among those recreation activities considered are off-road vehicle use, camping, hiking, backpacking, fishing, and sightseeing. Hot spots of future recreation demand pressures include gulf coastal Florida, Alabama, Mississippi, and Louisiana; central Alabama; north Georgia; coastal South Carolina; and east Texas. Areas that experience high recreation demands typically end up being developed for tourism, and then ultimately into urban interface areas.

Figure 2.12
Projected ambient recreation pressures
on forest, 2020.

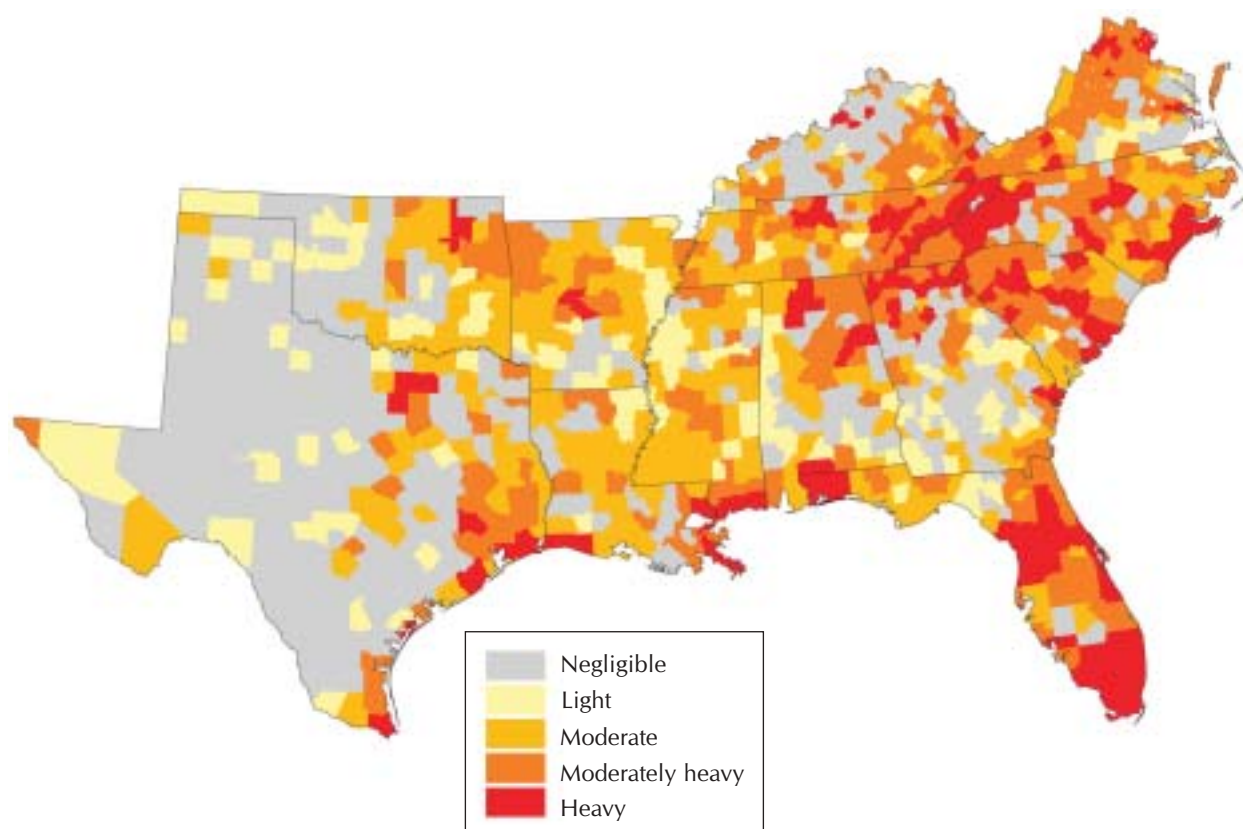
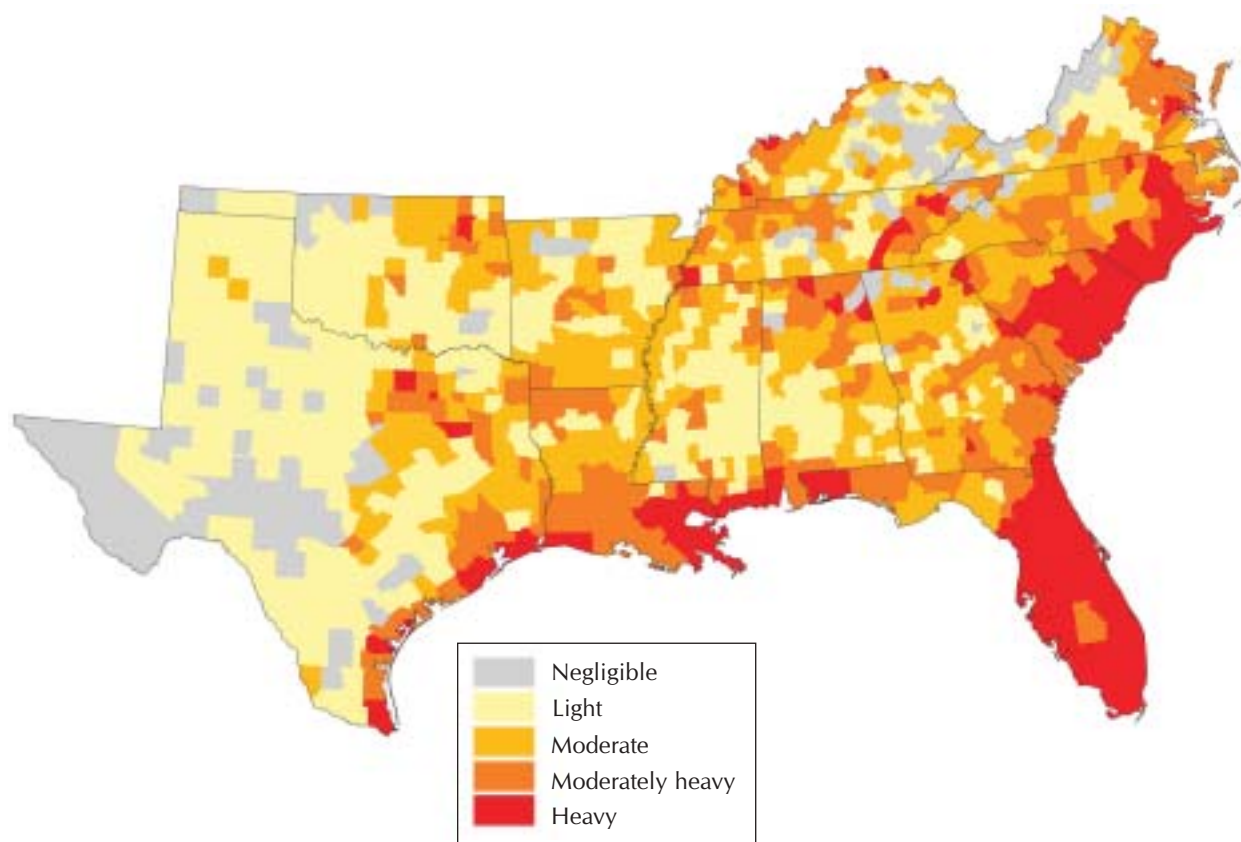


Figure 2.13
Projected ambient population pressures
on public land, 2020.

Public Land and Population Growth

Most of the public land in the South is forested and makes major contributions to the amenity character of southern landscapes. Public land includes national forests, national parks, wildlife refuges, Federal reservoirs, and State parks and forests. Migration to high-amenity areas where these public lands are located is putting unprecedented pressures on public land managers. Hot spots where future population growth pressures are likely to be most pronounced can be seen in **figure 2.13**. Especially highlighted are south and central Florida, coastal Alabama, the Southern Appalachians, Cumberland Plateau area of Tennessee, northern Virginia, and coastal North Carolina.

“It seems like every woodlot is for sale, and everybody’s looking for that piece of property that’s close to public property. They develop and build around it.” Florida



Water and Wetlands and Population Growth

Water may become the most critical limiting natural resource anywhere in the region. Water shortages, which used to be associated only with the dry Western States, increasingly are a reality for the South. In **figure 2.14**, massive areas of future population pressure on aboveground water and wetland resources can be seen. Hot spots include eastern Virginia; the Coastal Plain of North and South Carolina; almost all of the Florida peninsula; coastal Texas, Louisiana, Mississippi, and Alabama; and a string of counties on the Cumberland Plateau in Tennessee.

Figure 2.14
Projected ambient population pressures
on water and wetlands, 2020.

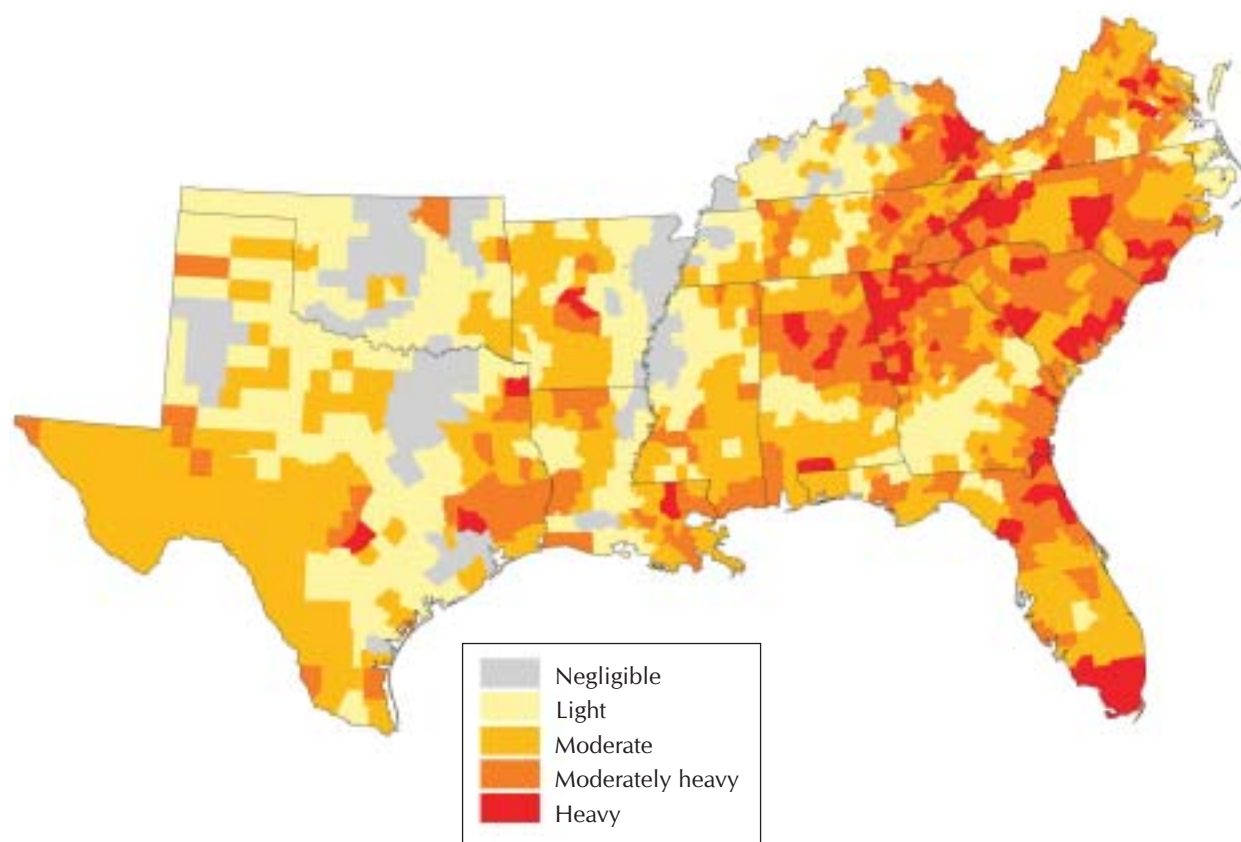


Figure 2.15
Projected ambient population pressures
on wildlife habitat, 2020.

Wildlife Habitat and Population Growth

Figure 2.15 shows the distribution of projected population growth overlaid onto the relative abundance of wildlife habitat in the South. Wildlife habitat occurs where there is public land, a large stretch of forest or other undisturbed natural land, and wetlands. Of all the attributes of natural land in the South, wildlife habitat may be the most endangered by human growth pressures. Hot spots most noticeable include south Florida, coastal South Carolina, the Piedmont of North and South Carolina, and the Southern Appalachians.

Needs

Research

There is a critical need to know much more about the rapidly expanding sphere of human influence on the South's rural land and water. Specific areas of need include:

- ◆ An efficient system for accessing current data and information on changing population, demographics, economics, recreation demands, and other social trends affecting land uses and urbanization in the South.

- ◆ A way to identify the recreational importance and primary users of public land and other open spaces near urban areas in the South.
- ◆ Studies of urban residents' attitudes toward land uses and management.
- ◆ Data, Geographical Information Systems (GIS) capacity, indexing systems, and other tools for monitoring and forecasting urban expansion, economic development, recreation demands, and other human pressures that cause land use changes.
- ◆ Approaches and models for predicting the effects of urbanization and other land use changes in the South on the size, condition, and benefits flowing from urban, rural, and wildland-urban interface forests.

Education

Education will be one of the keys to sustaining forests and other natural land and water in the South. Rapid social, economic, and land use changes point to an urgent need for effective conservation education. To support education initiatives, information is needed about:

- ◆ Patterns and trends in urban and rural residents' knowledge, perceptions, and opinions about urban expansion and other southern land use issues, especially the effects of urban expansion on rural land, water, and wildlife as well as human communities.
- ◆ The knowledge, opinions, demographics, lifestyles, and other differentiating characteristics for segmenting urban and rural publics, including private landowners.
- ◆ Paths for communication across the broad spectrum of people making up the South's population and design of education modules specific to the paths and population segments identified.

Management

Management is interpreted here to mean the broad array of land use policies, incentives, regulations, and practices on public and private land and water in the South. The most critical management initiatives needed include:

- ◆ An array of policy approaches and incentives to influence land use decisions to favor sustainable management and conservation of natural land, water, wildlife habitat, open space, and forests.
- ◆ Timely guidelines for urban expansion that emphasize minimal land development, ecosystem disturbance, water consumption, and forest fragmentation.
- ◆ Effective and lasting coalitions of public and private interests, including developers and urban and rural landowners.
- ◆ Giving emphasis to areas of the South identified as hot spots, a system for continuously monitoring attitudes and values and using the results to develop mutually acceptable strategies for accommodating growth while sustaining natural ecosystems.

Tools

Tools for addressing wildland-urban interface research, education, and management must be developed jointly with the wide array of research, conservation education, and management organizations and agencies in the South. Generally, tools would include:

- ◆ A consortium of Federal, State, and university research institutions and agencies that would help strengthen and focus resources and expertise in areas such as urban forestry, demography, recreation, wildland protection, ecosystem monitoring, GIS development, land use, wetlands, wildlife, and economics.
- ◆ Linking with existing population survey efforts and developing dissemination approaches for keeping researchers, educators, decisionmakers, legislators, and managers current on trends in people's values, opinions, demands, and movements.
- ◆ Models for forecasting change scenarios and interactions among population, ethnic makeup, economic growth, recreation/tourism demand, land development, natural cover, and land uses.

Conclusion

Population, demographics, recreation demands, and other social trends are key factors affecting land use and urbanization in the South. Understanding these trends and projections of change is important for identifying where human pressures will have the greatest effects on natural resources and their management in the future.

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Chapter 3



ECONOMIC AND TAX ISSUES

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Introduction

Economic conditions and tax policies affect land use decisions everywhere, but their effects on the rate of change in land use are particularly large in the wildland-urban interface. We begin this chapter with a brief economic history of the South and a description of the macroeconomic trends and conditions that affect microeconomics at the wildland-urban interface. Next comes a description of the many Federal and State taxes that affect nonindustrial private landowners. This is followed by a summary of historical trends in rural land taxation and a discussion of how taxes affect land use change at the wildland-urban interface. The chapter concludes with discussion of existing economic and tax tools and of challenges and opportunities in research, education, and policy. ▶



Economic Trends and the Wildland-Urban Interface

Historical Trends in the South

From its earliest settlement through the end of the 19th century, the South's economy was based on agriculture and natural resource extraction. The population was dispersed throughout the region, and very few major metropolitan areas developed. Around the turn of the century, southern governors and mayors sought to attract northern industries to the area by touting the region's modest tax rates and inexpensive labor, and by offering relocation subsidies. Because subsidies often included substantial tax incentives, industries contributed little to the generation of tax revenue. With modest tax revenues, local governments could not increase school spending, so the low-skilled labor pool remained that way, and wages remained low. Furthermore, many of the industries that came south were declining in competitiveness, and their move south was a temporary stop on their way overseas.

Changes in these trends came gradually, but their influence throughout the South lasted until the 1970s and continues to affect parts of the region today (Autry and others 1998, Cobb 1990). Since 1978, nearly 4 of every 10 jobs gained in the United States were in the South. During the same period, the number of jobs increased by 54 percent in the South and by 38 percent in the rest of the Nation. While the South has narrowed the gap, it still trails the Nation in per capita income. A generation ago the South depended on tobacco, textiles, other low-skilled blue-collar manufacturing processes, and northern capital. While portions of the South still depend on these economic sectors, today southern industry draws on global capital to fuel a diversified economy that includes automotive, chemical, computer manufacturing, and blue- and white-collar service sectors (Bishop and others 2000). The South is also attracting new residents. Between April 1, 1990, and April 1, 2000, the South's population grew by 13.9 percent, mostly attributed to immigration from other countries and migration to the South from other regions of the United States. A more detailed description of demographic changes in the South is provided in chapter 2.

For much of the 20th century, industrialization of the South occurred without significant urbanization (Schulman 1994). Today, however, the majority of job and population growth occurs in and around large cities, and 7 out of 10 southerners live in metropolitan areas (**fig. 3.1**). On average, the South's major metropolitan areas grew faster than 3 percent per year since 1970 (Autry and others 1998) (refer to chapter 2 for details on urban growth and rural transition). Unlike urban areas in the Northeast and Midwest, southern cities have adopted a sprawling growth pattern with urban centers surrounded by successive rings of suburban neighborhoods and bedroom communities. For example, in Charleston, SC, for each 1-percent increase in population since 1973, urban land use increased by 6 percent (Allen and Lu 1999). During the same time period, the population of Mobile, AL, grew 25 percent while its urban footprint doubled (Southern Environmental Law Center 1999). Woodstock, GA, has over 66,000 residents, but it and surrounding areas in southern Cherokee County host fewer than 14,000 jobs. The vast majority of these residents commute to Atlanta to work (Brookings Institution 2000). Further discussion related to land use patterns and public policy is presented in chapter 4.



Photo courtesy of USDA Forest Service

Figure 3.1
In the South, the majority of job and population growth occurs in and around large cities.

Macroeconomic Trends

Economic factors involving areas larger than one or two counties fit the term “macroeconomics.” Macroeconomic trends contributing to change at the wildland-urban interface are, by and large, related to efforts to improve the southern economy as a whole. As chapter 4 indicates, local governments receive most of their funding from property and sales taxes. This creates an incentive to promote economic development at the local level. For example, in the early 1990s South Carolina successfully lobbied German automaker BMW to locate its American

“We don’t have any sources of income in local government other than property tax, so that tends to drive an awful lot of these issues. If your only money is coming from the land, you have some self-interest in seeing it developed.” Virginia

automobile assembly plant on Interstate 85 near the city of Spartanburg. Initially drawn to the area by its relatively low cost and abundant blue- and white-collar labor, by the close proximity of a land-grant university with a strong engineering program, and by easy access to the interstate highway transportation system, BMW finalized its decision when the State provided special tax incentives and agreed to make substantial improvements to the Greenville, SC, airport. Anchored by BMW, BASF, and Michelin, more than 90 international companies are located in the area. South Carolina’s portion of Interstate 85 is referred to as “America’s autobahn” (Bishop and others 2000). Pioneered in North Carolina’s Research Triangle Park, this exploitation of available labor, interstate highways, universities, and incentives has been a powerful force in the modern southern economy. Urban areas throughout the region have been best positioned to utilize this multifaceted approach and have grown, while rural areas dependent primarily on blue-collar manufacturing industries and agriculture have declined. Chapter 2 provides additional information on shifts in employment within the southern economy.



Photo by Annie Hermansen, USDA Forest Service

Figure 3.2
Roads are often widened to accommodate increased development in the interface.



Photo courtesy of USDA Forest Service

Figure 3.3
An increase in development in the wildland-urban interface can cause some residents to seek new development on a new interface.

As these cities grow, interface areas become more attractive to develop and to live in. Rural landowners find it financially attractive to subdivide farms and forests. In fact, rising land values and property taxes force some landowners to subdivide to keep any land at all. New residences and business parks require sewer, water, garbage, fire, emergency medical services, and schools, but especially, they require bigger roads to facilitate increased automobile traffic (**fig. 3.2**). Bigger roads bring additional interface areas within reasonable commuting time from city centers, begetting more residential development. Lower home prices in these new developments draw families out of more expensive and congested areas. Congestion and other negative factors increase in developed, former interface areas, and eventually reach levels that spark some residents to seek a new development on a new interface, repeating the cycle (**fig. 3.3**).

A reluctance to utilize zoning restrictions, land use planning, and other growth management strategies is the final macroeconomic factor in the southern interface (see chapter 4). The result is that developers for the most part pay only a fraction, if any, of the costs borne by governments to extend services to new developments (Pae 1997).

The pace of urban development in the South is sobering. In Atlanta, over 350 acres of open space are converted each week, and in northern Virginia, on average, 28 acres are converted each day. Whereas the United States lost 6 percent of its farmland between 1982 and 1997, the South lost 10 million acres, or 14 percent (Southern Environmental Law Center 1999).

Unknowns include the costs related to regional declines in environmental quality resulting from urbanization, such as reduced air and water quality, increased energy costs, increased storm runoff and sewer infiltration, and loss of recreation opportunities. Also not known is the increased monetary and nonmonetary value of rural land to an urbanizing society. All of these costs can be associated with human influences to forest ecosystems (see chapter 5).

“I’d take you to several places across north Georgia that have very intense commercial development, shopping centers, factory malls, and that type of thing. Then you go a mile down the road and look at the small farms and the ‘for sale’ signs on those properties.” Georgia

Microeconomic Trends

The term “microeconomics” describes localized conditions such as changes in prices, the amount collected in tax revenues, expenditures to provide services, and other situations that might be faced by an individual family, county, or municipality. Microeconomic conditions can be divided into two categories: monetary and nonmonetary. Monetary costs are measured in dollars, whereas nonmonetary, or “quality-of-life,” costs are expressed in other terms. Governments, private individuals, farmers, and forest land owners are among the many who pay these microeconomic costs.

Land development in the wildland-urban interface generates less revenue than municipal governments spend to provide services to the area. Numerous studies have shown that municipalities spend between 15 and 80 cents in services for every dollar of tax revenue generated by farms and forests, and between 15 and



Photo by Annie Hermansen, USDA Forest Service

Figure 3.4

Municipalities spend far less to provide services for farms and forest lands than they do for residential development.

47 cents for every dollar of revenue generated by commercial development (**fig. 3.4**). In contrast, spending on services for residential development ranges from \$1.04 to \$1.55 per dollar of revenue collected (Esseks and others 1999). These costs would have been even larger had the nonmonetary value provided to municipal governments by forests been considered. For example, the trees lost to development in the Puget Sound region since 1973 would have reduced stormwater storage requirements by 1.2 billion cubic feet—the equivalent of a \$2.4 billion stormwater management system (Smith 1999).

Many southern examples illustrate the revenue problem. Prince William County, VA, spent \$3,838 to provide services to the average single family home, while the same home generated \$2,150 in revenue (Lipton and Perez-Rivas 1996). Fairfax County, VA, had only \$700 million of the estimated \$1 billion needed to provide schools, fire stations, libraries, and other infrastructure to growing interface areas. Nearby Loudon County anticipates the need to build 22 new schools in the next 6 years (Frankel and Fehr 1997, Katz and Liu 2000). An additional cost factor is damage to road and bridge infrastructure as increased traffic exceeds original design standards. Additional discussion on infrastructure costs is provided in chapter 4.

While this arrangement appears to favor private individuals in residential settings who receive more in services than they pay in taxes, a look at some of the monetary and nonmonetary costs they face presents a different picture. They face lower quality, overcrowded schools that expend a significant portion of their budgets on busing and less efficient fire, police, and ambulance services. Emergency units have increased response times as they attempt to cover larger territories and longer distances (Esseks and others 1999). The numbers of miles driven by interface residents and the time they lose to traffic delays have increased in most large- and medium-sized cities (**fig. 3.5**). Between 1987 and 1997, Virginia's population increased by 16 percent while the number of miles per driver increased by over 60 percent. Atlanta, GA, area residents drive the most miles per person per day (34 miles) of any city in the United States (Southern Environmental Law Center 1999). Average household transportation expenditures by Houston, TX, and Atlanta, GA, residents in 1997–98 were \$8,840 and \$8,513, respectively, or slightly more than 20 percent of total household expenditures (McCann 2000). Finally, there is a social cost that is often overlooked: resources diverted to providing services and infrastructure to interface areas reduce the amount available for similar actions in city centers. Businesses migrate outward from these areas, isolating poorer and less-educated residents in stagnating or declining metropolitan zones. In some instances, low-skilled, blue-collar workers cannot afford to commute to suitable jobs available in interface areas (Katz and Liu 2000).

Rural landowners in the interface also bear their share of costs. In a 1999 study, researchers at the Southern Rural Development Center found that highest rural land prices were exclusively in counties adjoining metropolitan areas.

Figure 3.5

The number of miles that interface residents commute is increasing for many medium- and large-sized cities.



Photo by Nick Cowie

Furthermore, they estimated that row-crop agriculture in high-value areas throughout the South would not generate a 4-percent rate of return to a landowner (Hite and others 1999). The implicit costs of rural land management in the wildland-urban interface are further increased by the amount owners forgo in returns they could have gained by selling the land and investing the proceeds in other venues (Hite and others 1999).

“I work with landowners trying to encourage them to manage their timber, and they’re getting offered \$10,000 per acre for the land. I’m trying to tell them to plant trees on it, and in thirty years they might see a profit.” Georgia

Economic returns to owners of forests and wildlands are more difficult to calculate. Investors consider not only the productive capacity of the land, but interest rates, fluctuating stumpage values, and irregularly timed returns on management treatments, as well as a long time horizon between revenue-generating events. In a Mississippi example looking at three time periods, three different rates of return were calculated (Hartsell and Bullard 2000). Forestry-based returns were noticeably higher than the rates of return for row-crop agriculture identified by Hite and others (1999). This work looked at mature, undisturbed timberland and not at forest land at the urban interface, where high land prices (as much as \$5,000 per acre in the case of northern Virginia) raise real and implicit forest land management costs and lower returns to timber investments (Hite and others 1999).

Tax Issues Driving Change

Throughout the United States, Federal and State taxes affect every aspect of rural land ownership. The land itself is taxed annually, income derived from the land is taxed, the transfer of land and other assets from one generation to another is taxed, and, in several States, the act of removing timber or minerals from the land is taxed. Depending upon how they are structured, taxes can accelerate development at the wildland-urban interface or help shape development to meet the needs of a growing population while retaining as much land as possible in a rural condition.

Individuals and families own 97 percent of farm acres (National Agricultural Statistics Service 1999) and 70 percent of private forest acres (Birch 1996) in the South. Except where otherwise noted, we focus here on the effect of Federal and State taxes on these nonindustrial private landowners. Individuals and families hold land for a variety of reasons, many of which are unrelated to financial returns, and few people respond solely to economic pressures. At the same time, however, an understanding of the economic pressures that Federal and State taxes place on rural landowners can provide insight into the reasons behind land use changes occurring at the wildland-urban interface.

Federal Taxes

Income tax—Since its institution in 1913, provisions have been added to the Federal income tax to encourage improved management and stewardship of farm and forest land. These provisions help owners retain their land in rural uses. Some examples are:

- ◆ Farmers can average their income over 3 years, a provision that is not available to other taxpayers (Internal Revenue Service 2000).
- ◆ Farmers also can immediately deduct part or all of the cost of qualifying expenditures for soil and water conservation, expenditures that other taxpayers must capitalize (Internal Revenue Service 2000).
- ◆ Farmers and forest owners can exclude from their gross income part or all of qualifying payments they receive from cost-sharing programs such as the Environmental Quality Incentives Program, the Forestry Incentives Program, the Stewardship Incentives Program, the Wetlands Reserve Program, or the Wildlife Habitat Incentives Program (Haney and others 2001).
- ◆ Forest owners can take a 10-percent investment tax credit on and amortize (write off) over 8 tax years up to \$10,000 per year of reforestation expenses (Haney and others 2001).
- ◆ Landowners who sell natural resources, such as timber or minerals, can recover their investment in the resource by taking a depletion deduction (Haney and others 2001, Siegel 1978).

Income from the sale of timber generally can qualify as a “long-term capital gain,” which is taxed to individuals at a maximum rate of 20 percent (Haney and others 2001). Most other income from rural land is “ordinary income,” which is taxed at rates that range as high as 39.6 percent. This is true whether the income is farm related from the sale of field crops or livestock (Internal Revenue Service 2000) or forest related from the sale of products like pulpwood or firewood made from harvested trees, pine straw, mushrooms or medicinal plants gathered from the forest, or from hunting leases (Haney and others 2001) (**fig. 3.6**).

The Federal income tax has the greatest economic effect of any tax on working land in the South (Greene 1995, 1998), because it applies uniformly across the region and because the tax rates are high compared to most other taxes. The economic effect of the tax is to increase the variable cost of owning or managing rural land. The tax, therefore, influences production decisions (Gregory 1972).

Particularly if the opportunity cost of keeping land in its present use is increasing, the Federal income tax places pressure on rural owners to sell or convert their land. At the wildland-urban interface, an area undergoing slow development might see a gradual shift from less intensive to more intensive uses over time, with



Photo by Robert L. Anderson, USDA Forest Service

Figure 3.6
Income from the sale of nontimber forest products, such as shitake mushrooms, is taxed at rates that range as high as 39.6 percent.

Figure 3.7

In the wildland-urban interface, an area undergoing slow development may see a gradual shift from rural to developed uses; an area undergoing rapid development may see a sudden conversion, with little or no intermediate shift in uses.



Photo by Hans Rekerk, University of Florida

individual holdings at the edge of the interface being converted from rural to developed uses. An area undergoing rapid development might see a sudden conversion from rural to developed uses, with little or no intermediate shift in uses (fig. 3.7).

Estate and gift taxes—The Federal Government has taxed transfers of estates since 1916 and lifetime gifts since 1932 (Haney and Siegel 1993). Congress combined the estate and gift taxes into a single structure in 1977. As society in general has become wealthier, Congress has redefined what constitutes a taxable transfer. At present, gifts up to \$10,000 per recipient per year plus other lifetime gifts and estate values below the amount shielded by the “unified credit effective exemption” are not taxed. The Economic Growth and Tax Relief Reconciliation Act of 2001 increases the unified credit effective exemption from \$675,000 to \$1 million beginning in 2002 and gradually reduces the top rate for Federal estate and gift taxes from 55 to 45 percent by 2009. The act eliminates the estate tax entirely and sets the top tax rate for gifts equal to the top individual income tax rate beginning in 2010. The act itself, however, is scheduled to “sunset” at the end of that year, returning estate and gift taxes to current law (Manning and Windish 2001).

Many strategies exist to reduce or eliminate the impact of the estate tax, so the brunt of the tax is borne by the estates of people who fail to plan or who do not realize the value of their assets. Sharp increases in timber and land values over the past two decades (Morrow and Fritschi 1997, Peters and others 1998) have put many rural landowners into the second group.

“Part of what’s driving all the loss of our farmland is taxes. When the older generation dies, the younger generation that now has this large farm can’t afford to pay the estate taxes on that property and has no choice but to at least sell part of it, if not all of it, in order just to pay the taxes.” Virginia

The economic effect of estate, inheritance, and gift taxes is difficult to quantify, because they occur at irregular intervals. They do, however, increase risk and place a premium on keeping management options open. For rural landowners, the consequences of inadequate estate planning can be severe, requiring the premature sale of timber or the conversion or sale of land if other family assets are not adequate to pay the estate tax. A study undertaken to quantify the effect of the Federal estate tax on forest owners found that rural landowners in general are many times more likely than the U.S. population as a whole to be affected by the estate tax. The study estimates that, nationwide, on the order of 2.6 million acres

of forest must be harvested and 1.3 million acres must be sold each year to pay the Federal estate tax (Greene and others, in press).

The cost of minimizing the estate tax also is high, both in terms of the fees paid to estate planning professionals and the personal cost of following tax-minimization strategies. Virtually all of the strategies involve transferring ownership or surrendering control of assets through the use of gifting, trusts, or ownership structures like family-limited partnerships and limited-liability corporations. Rural landowners' inability or unwillingness to sustain the dollar cost, loss of control, and management changes required to minimize the Federal estate tax is another reason an inordinately high proportion of rural estates incur the tax.

State Taxes

Income taxes—The Southern States vary widely in the way they tax personal income. The tax codes of seven States correspond closely to the Federal income tax. Of the five remaining States, Alabama, Arkansas, and Tennessee have their own definitions of taxable income, while Florida and Texas do not tax income at all (Bettinger and others 1989). State income taxes have a smaller impact on rural landowners than the Federal income tax, because their rates are a fraction of the comparable Federal rates (Bailey and others 1999). In terms of their economic effects, State income taxes generally mirror those of the Federal income tax (Holley 1988): they influence production decisions and contribute to the development of land in areas that are undergoing development.

Estate, inheritance, and gift taxes—Southern States also vary widely in the way they tax the transfer of estates and gifts. Like the Federal Government, Mississippi and South Carolina levy an estate tax on the right of a decedent's estate to transfer property. Kentucky, Louisiana, North Carolina, and Tennessee, on the other hand, levy an inheritance tax on the right of heirs to receive property. The remaining States impose a "piggyback" tax, equal to the credit for State death transfer taxes allowed on the Federal estate tax return. Four States—Louisiana, North Carolina, South Carolina, and Tennessee—also tax gifts made during the donor's lifetime (Walden and others 1987). As with Federal estate and gift taxes, most of the cost of State transfer taxes falls on families that fail to plan, and tax minimization strategies entail giving up ownership or control of the land. Researchers have noted that the tax burden in States that have a piggyback tax is somewhat lower than in States that use other types of transfer taxes (Walden and others 1987).

Property and yield taxes—As in other regions of the United States, rural land in the South originally was assessed and taxed based on its "highest and best use," using an unmodified ad valorem property tax. Highest and best use typically is interpreted as the use that would generate the greatest economic return to the owner, given the overall level of development in the area. By this method, farm or forest land in an area undergoing conversion to commercial use would be assessed and taxed as commercial rather than agricultural land, increasing the property tax burden and placing economic pressure on the owner to convert or sell. Such an occurrence was rare through the early decades of the 20th century, when the South was predominantly rural. As the region developed, however, it became clear that an unmodified ad valorem property tax encourages too-rapid conversion of rural land. The approaches the Southern States have taken to address the problem of taxing rural property appropriately fall into three categories: modified assessment laws, yield tax laws, and exemption laws (Siegel and Hickman 1989).

“ Involved with that are the taxation issues for farmlands and agriculture where the farmer wants to keep his one hundred acres and thirty head of cattle. Even with the preferential tax assessment we have in Georgia, which helps some, to me it doesn’t seem to go far enough.” Georgia

Under a modified assessment law, rural land is appraised differently from other forms of property. The assessed value of the land may be fixed, calculated using a reduced assessment rate, or calculated based on the land’s actual use instead of its highest and best use. All Southern States have modified assessment provisions for rural land (Siegel and Hickman 1989).

Yield tax laws and exemption laws apply only to forest land. Under a yield tax law, the forest is divided into land and timber components for property tax purposes. The land is taxed annually, but the timber is not taxed until it is harvested. The deferred property tax on the timber most often is based on the amount, or yield, of the harvest. Alabama, Louisiana, and Mississippi have yield tax laws (Siegel and Hickman 1989). Exemption laws remove forest land, timber, or both from the property tax rolls, either permanently or for a specified number of years. Alabama, North Carolina, and Tennessee have exemption laws; in all three States, the exemption applies to essentially all standing timber (Siegel and Hickman 1989).

Two Southern States have helped pioneer a policy under which landowners can opt to apply for a special assessment that further reduces their property tax in exchange for accepting certain use restrictions. Tennessee’s Greenbelt Program was one of the first of this type in the United States. Georgia also passed a version of this policy—the Conservation Use Valuation Assessment program—in 1991. The Georgia law, however, limits the program to ownerships under 2,000 acres. Larger ownerships, including all forest industry firms, remain under an ad valorem property tax. The results of Georgia’s approach have been mixed. In the counties surrounding expanding urban areas, rising ad valorem property taxes often reduce the returns to agriculture and forestry below a level that is acceptable to owners who cannot participate in the program. Forest industry firms in north Georgia, for example, are finding they make the most profit by performing what they term a “residential cut,” then subdividing and selling their interface holdings for development (Newman and others 2000).

Because they occur annually, property taxes have a greater potential than other State taxes to influence owners’ land use decisions (Greene 1995). The economic effect of property taxes is to increase the fixed cost of owning or managing rural land. Thus, property taxes influence owners’ decisions about whether or not to continue to hold land (Gregory 1972). As shown above, an ad valorem property tax promotes fragmentation, conversion, and development of rural land. In contrast, a modified assessment law should result in enclaves of land remaining in rural uses as the area around them develops. The stable property tax rate would enable families dedicated to a rural lifestyle to resist pressures to convert or sell—at least until the later stages of development.

Severance taxes—Seven Southern States—Alabama, Arkansas, Louisiana, Mississippi, North Carolina, South Carolina, and Virginia—levy a severance tax when timber is harvested or minerals are removed from the land. All of these

States with the exception of Louisiana use part or all of their timber severance tax receipts to support a forestry incentive program or another forest-related purpose (Haines 1995). The economic effect of a severance tax is minor (Greene 1995); taken alone, it would have little effect on a landowner's management or land ownership decisions.

Existing Economic and Tax Tools

So far, this work has focused on traditional economic, tax, and policy models that generally treat profit maximization (and loss minimization) as primary goals of human economic behavior. A challenge that remains is moving toward an approach that incorporates intrinsic, nonmonetary values of wildlands along with their monetary values. Ecological economics is a new discipline that has made strides toward this goal. Mitigation banks for carbon sequestration and wetlands protection are examples of the ecological economics approach. Under existing and proposed programs, forest land owners whose properties qualify are able to capture normally unrealized revenues from the intrinsic values of their lands by expanding their management efforts to include wetland restoration and carbon sequestration in living trees. These revenues may make it more profitable for landowners to continue rural land uses in interface areas, thereby slowing sprawl and land conversion.

Conservation easements represent another popular and effective method of incorporating social values and property rights with tax and other land valuation methods (Bick and Haney 2001) (see chapter 4). Underutilized opportunities for preserving forests at the interface include landowner cooperatives and forest banks (see chapter 6). These two conservation vehicles convert the normally irregular returns to forest investments into smaller annual payments. They can also keep rural land uses in interface areas economically competitive. However, these have proved largely ineffective up to now in most U.S. applications. One challenge to conservation easements and other approaches to reducing the rural landowner's tax burden and improving profitability is the lack of policy support at the municipal, county, State, and Federal levels. Tax incentives alone cannot prevent the conversion of rural land at the wildland-urban interface, nor can financial agreements that depend on group consensus. With a population that is growing, that is increasingly wealthy, and that is increasingly concerned with its quality of life, economic pressure will yield continued urban expansion. The best that may be accomplished is to eliminate tax and other policy incentives for urban sprawl.

Although there has been some policy action at the State and local levels to improve the economic and tax situation in the interface, these approaches are limited in their effectiveness or are too new to have a track record. State programs include Georgia's regional transportation authority in Atlanta, which has jurisdiction over transportation and air quality in the metropolitan area, and Tennessee's Annexation Reform Act of 1998, which directs counties to adopt comprehensive land use plans or risk losing eligibility for State infrastructure funds. Local and

"I would like to see the State legislature start looking at tax incentives for conservation easements and for the purchase of development rights by the State—ways to try to help keep these areas in green space despite the fact that development around them is causing the taxes on those properties to go up." Georgia

county-level programs are primarily limited to tree protection ordinances and road protection ordinances, but some counties and municipalities are moving toward programs that hold developers accountable for meeting a greater percentage of the costs of extending services to new interface subdivisions. Tree protection ordinances are effective at maintaining vegetation, but ordinances restricting mud from roads and limiting the weight of vehicles allowed to drive them will make timber management, at least, less cost-effective in certain jurisdictions (see chapters 6 and 7).

There currently is considerable interest in strategies to further reduce the property tax burden on forested and other rural land near the wildland-urban interface. Many strategies involve use of conservation easements (Beauvais 2000, Best 2000) (refer to chapter 4 for more policy-related tools). Other strategies involve governmental action to encourage the transfer of riparian land and forested buffers around new developments from private to public ownership, which concentrates owners' property tax liability on land that is economically operable (Honecny 2000).

Income tax incentives that have been under discussion during the past several years and that would reduce the Federal income tax burden on forested land include:

- ◆ Income averaging.
- ◆ Reducing the tax rates for long-term capital gains, either across-the-board or according to the number of years a capital investment is held.
- ◆ Enhancing the amortization provisions for reforestation.
- ◆ Permitting the immediate deduction of reforestation expenses.
- ◆ Extending the tax incentives available to owners who manage their forest holdings for a profit to owners who manage primarily for environmental or social purposes.

In addition to reducing the Federal income tax burden, the third and fourth of the above incentives have the potential to improve the management and stewardship of rural land because they are linked to reforestation of harvested areas (Greene 1998). The fifth incentive would encourage owners in all timber types to make environmentally beneficial investments in forest stewardship (Wear and Greis, in press).

With the percentage of estates subject to the Federal estate tax increasing yearly, there is active interest in additional ways to reduce the estate tax burden (Herman 2001). The methods under discussion include eliminating the estate tax altogether, reducing the rates, increasing the exemption, increasing the exclusion for interest in a family-owned business, and adding an exclusion for farmers and other rural landowners.

Needs

Research clearly has a role in:

- ◆ Determining which methods are most economically effective and socially acceptable for improving social and environmental conditions in the wildland-urban interface.
- ◆ Determining what factors lead to southern sprawl. Lessons can be learned from American cities outside the South that have successfully concentrated population growth on fewer acres.
- ◆ Identifying the monetary and nonmonetary costs related to changes in environmental quality resulting from urbanization, as well as the monetary and nonmonetary values associated with wildland and rural land to urbanizing areas.
- ◆ Identifying methods that encourage reclaiming of abandoned urban industrial sites and discourage unnecessary “green space” development.
- ◆ Examining the microeconomic factors affecting forest land investment in interface areas. This approach should include timber production as a management objective, but should also be targeted for landowners who are primarily motivated by the nonmarket attributes of their forest land.
- ◆ Determining the impact of various types of property, income, and transfer taxes on land use change, as well as the impact of tax-related landowner incentives programs.
- ◆ Demonstrating the most effective linkages of public policy with tax reform.

Educational needs include:

- ◆ Programs to alert potential new interface residents to the microeconomic conditions they will experience. This role necessitates new extension and other technology transfer agents. A comprehensive program must include outreach to county executives, county councils, city planners, and other local officials.
- ◆ Programs that target policymakers. Positive changes in economic and tax issues at the interface depend almost entirely on policymakers. Efforts by individuals to minimize their tax burden or maintain the profitability of their undeveloped land are not likely to succeed in the absence of a committed vision for land use.

Conclusion

The economic and tax conditions facing rural landowners at the wildland-urban interface are numerous and complex. Some economic issues have tangible and easily quantified monetary costs associated with them; others that are just as important, such as quality of life, are harder to link to a price tag. Property, income, and transfer taxes, in combination with high land prices, make it difficult for some owners to keep their land in rural uses or to transfer their land to the next generation. Often, these economic and tax relationships and their contribution to

land use change at the urban-wildland interface are poorly understood. Some tools to help landowners maintain their land in a rural condition exist, but are either underutilized or of limited effectiveness without a concerted effort by policymakers to integrate and coordinate Federal and State tax codes and landowner assistance programs.

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Chapter 4



LAND USE PLANNING AND POLICY ISSUES

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Introduction

How can land be used, and who makes that determination? These are among the most contentious questions faced by any community. When that community is in the wildland-urban interface, conflicts can arise between newcomers and long-term residents; between private and public land management needs; and between Federal, State, and local governments. Current land-related public policies at all levels of government are contributing to the severity of these conflicts by failing to provide a way for communities to direct and control the increasing demand for land development that results when large numbers of people move into the interface. As long as people have the ability and desire to live in rural and undeveloped areas, land use policies should be designed to minimize the negative impacts such movement has on natural resources in the interface. ►



Table 4.1—Southern State rankings by acreage and rate of non-Federal land developed for 1992–97 and 1982–92^a

State	1992–97			1982–92		
	Rank	Change in total land developed	Avg. annual conversion rate	Rank	Change in total land developed	Avg. annual conversion rate
		----- Acres -----			----- Acres -----	
Texas	1	893,500	178,700	1	1,387,000	138,700
Georgia	2	851,900	170,380	5	738,400	73,840
Florida	3	825,200	165,040	2	1,088,200	108,820
North Carolina	6	506,600	101,320	3	933,100	93,310
Tennessee	7	401,900	80,380	7	464,000	46,400
South Carolina	10	362,000	72,400	11	386,400	38,640
Virginia	11	343,500	68,700	10	441,000	44,100
Alabama	13	315,300	63,060	13	320,400	32,040
Kentucky	16	237,100	47,420	12	355,100	35,510
Mississippi	22	206,400	41,280	29	147,400	14,740
Oklahoma	26	176,700	35,340	27	156,100	15,610
Arkansas	28	168,900	33,780	36	96,800	9,680
Louisiana	29	133,600	26,720	18	256,300	25,630

^a Out of 49 States. Alaska data not yet available.

Source: Natural Resources Conservation Service 2000.

Natural resource management and conservation in the interface are complicated by current land-related public policies. These challenges are related to both the amount of land being developed in the interface and the speed with which this development is taking place (**table 4.1**). The health and condition of natural resources are also related to the manner in which land is developed. It often appears that land use decisions are made without regard to the sensitivity of the landscape or its suitability for development. Land development too often inhibits natural ecosystem functions, such as flood mitigation and natural habitat. The migration of large numbers of people into the wildland-urban interface, however, creates increasing demand for land development, public services and infrastructure, and places greater strains on existing natural resources (**fig. 4.1**).

Current Public Policies and Programs Affecting the Wildland-Urban Interface

Federal Policies and Programs

Various Federal laws and programs have created incentives for development within the interface. For example, the Federal Government subsidized the creation of the State numbered route system and the National Interstate Highway System. This road expansion has opened up previously isolated land to development. Development has been further encouraged by the availability of federally backed mortgages through the Federal Housing Administration and the Veterans Administration (Rylander 2000).



Photo by James Kundell, University of Georgia

Figure 4.1
Development for housing has allowed erosion and sedimentation to occur which can affect the quality of nearby water.

While the net result of such Federal policies has been to facilitate population movement into the interface, other Federal policies and programs are designed to protect and conserve the natural resources of public and private land. For example, pollution control laws such as the Clean Air Act (CAA) and the Clean Water Act (CWA) were created to decrease air and water pollution. To do so, the laws limit certain land use practices. The CWA, for instance, contains provisions for area-wide land use planning to address pollution from nonpoint sources. In addition, under the CAA, States create air-quality control regions and prepare State Implementation Plans (SIP) that are designed to enable each region to attain federally set numerical limits for ambient concentrations of specific pollutants. If a region fails to meet its SIP obligations or fails to prepare an adequate SIP, Federal highway funds can be jeopardized and new construction can be halted. In contrast, the Coastal Zone Management Act attempts to minimize adverse impacts of development in coastal areas by providing Federal funding and guidelines for States to develop coastal management plans tailored to fit their specific needs. The Endangered Species Act (ESA) is another example of a Federal law whose purpose is to conserve and protect natural resources. The ESA prohibits both public and private individuals from “taking” any species that has been listed as threatened or endangered. Under the takings provision, a habitat modification that indirectly kills members of a listed species can be prohibited, even if this habitat is privately owned.

State Policies and Programs

Authority to guide land use decisions lies mainly with the States, which may choose to delegate this power to local governments at the county or municipal level. State and local governments have authority to regulate land uses and forest practices based on police powers that can be invoked to protect the public health, safety, morals, and welfare.

Forest management practices play an important role in land management in the interface. Actions by private forest landowners that might pollute or damage roads may be regulated by the State directly through forest practice ordinances and indirectly through tree conservation, water quality, wetlands, and open-burning laws (figs. 4.2A, 4.2B). In the South, forest regulatory ordinances are usually adopted by counties (or parishes in Louisiana) and tend to be concerned with protecting

Figure 4.2

(A) Regulation of private forest land addresses a number of management activities including clearcutting; (B) some Southern States have relied on nonregulatory use of forestry best management practices to ensure that forest practices provide adequate protection to the environment, especially water quality.



Photo by James Kundell, University of Georgia

(A)



Photo by James Kundell, University of Georgia

(B)

local government investments in roads, bridges, and highway infrastructures. However, State government environmental policies can be an important stimulus for the creation of local forest laws. For example, Virginia requires localities to regulate forestry activities adjacent to the Chesapeake Bay (Martus and others 1995). Tree protection ordinances generally apply to the removal of trees associated with land clearing and development. Often enacted in response to changes from rapid land development, tree ordinances range in complexity from simple tree replacement standards to more comprehensive ordinances addressing natural resource issues (U.S. Department of Agriculture, Forest Service 2001). Nonregulatory best management practices (BMPs) are another way Southern States have attempted to ensure that forest practices provide adequate protection to the environment, especially water quality. These BMP programs are usually not mandatory in the South. The Florida Division of Forestry, for instance, has developed voluntary BMPs for silvicultural operations near streams, rivers, lakes, and wetlands (Cubbage 1991). However, BMP programs are not always completely voluntary. A North Carolina regulation requiring landowners to prepare an erosion and sediment control plan for activities that disturb more than one contiguous acre exempts forestry operations, provided that forest owners and operators adhere to performance standards established by the forest practices guidelines on water quality. State forestry BMPs are recommended as a way to achieve compliance with these water-quality standards (Cubbage 1995).

While the States generally delegate their authority over land use to local governments, State legislatures can review or supersede local zoning where statewide interests are at stake. The State's police powers are usually delegated through enabling statutes, frequently patterned after the Standard State Zoning Enabling Act (SSZEA) of 1924. The SSZEA was intended to provide a common statutory zoning scheme for municipalities engaged in controlling land uses. This model act was eventually adopted by all 50 States and is still relied on by many States today (Nicholas 1999). A 1997 survey conducted by the American Planning Association as part of its Growing Smart Project revealed that many Southern States lack modernized planning statutes (American Planning Association 1999) (**tables 4.2, 4.3, 4.4**). This deficiency makes it more difficult for these States to effectively manage growth and change in the interface.

Table 4.2—The status of land use planning statutes (extent of updates to State legislation governing local planning) in the Southern States, 1997

State	Extent updated			
	Substantially	Moderately	Slightly	None
Alabama				X
Arkansas			X	
Florida	X			
Georgia	X			
Kentucky		X		
Louisiana				X
Mississippi			X	
North Carolina				X
Oklahoma				X
South Carolina		X		
Tennessee				X
Texas				X
Virginia				X

Source: American Planning Association 1999.

Nationally, several States have adopted comprehensive growth management plans. In general, these plans establish statewide goals and policies, create regional agencies charged with reviewing and coordinating local plans, and require local governments to prepare plans that implement State goals. While statewide planning systems are designed to provide intergovernmental coordination, all too often, lack of local government cooperation prevents achievement of the goals of the State plan. Florida's attempt at implementing its comprehensive growth management plan is a case in point. While Florida's comprehensive planning statute requires local governments to adopt local land-development regulations that implement and are consistent with the State comprehensive plan, sprawling development remains rampant, and local zoning decisions still favor low-density and large-scale forms of development (Nelson and others 1995, Porter 1999).

State infrastructure policies have also contributed to problems with land-development patterns in the interface. Under the SSZEA, States are confined to regulating only narrow areas of State interest, such as highway systems. As a result, State departments of transportation are answerable only to the Governor and State legislature, and can build roads without regard for local plans or land use consequences (Buzbee 1999, Lindstrom 1997). State funding programs for basic community infrastructure also tend to promote development in the interface by emphasizing funding of new facilities rather than rehabilitation or replacement of older systems. State water and sewer system financing programs likewise are mostly concerned with adding capacity (Porter 1999). The consequences of such policies are expensive both environmentally and financially. For example, it has been estimated that South Carolina will pay more than \$56 billion in infrastructure costs between 1995 and 2015 if current development trends remain unchecked.

Table 4.3—The status of land use planning statutes (State with legislation mandating local land use planning) in the Southern States, 1997

State	Planning mandated?		
	Yes	Conditionally ^a	No
Alabama		X	
Arkansas			X
Florida	X		
Georgia	X		
Kentucky	X		
Louisiana		X	
Mississippi		X	
North Carolina			X
Oklahoma		X	
South Carolina		X	
Tennessee		X	
Texas			X
Virginia		X	

^a The statute requires a local government to develop a plan only if it chooses to first create a planning commission.

Source: American Planning Association 1999.

This total amounts to \$750 per citizen per year for the next 20 years (Burchell and Shad 1998) (see chapter 3 for more discussion on infrastructure costs).

Local Policies and Programs

Traditionally, the authority to guide and restrict land use has been the prerogative of local governments. The scope of local authority to make land use decisions is determined by whether the locality exists in a State with the Dillon rule or home rule. Under the Dillon rule, local governments may obtain power to govern only through a clear and expressed delegation of power by the State. In contrast, under home rule, State legislatures may give local governments the power to legislate with respect to local matters. State legislatures may limit, expand, or withdraw the locality's authority at their discretion. The extent to which home rule operates to limit the scope of State power varies from State to State. However, even in States where the scope of home rule is broad, State law supersedes local law except to the extent that it is prevented from doing so by the State constitution or by statute (Weiland 2000). Today, nearly every State has some type of home rule provision enabling municipalities to exercise some degree of self-governance.

Local governments exercise their authority over land use decisively through zoning ordinances. By geographically separating and organizing different land uses, zoning laws prevent incompatible uses from interfering with one another

Table 4.4—The status of land use planning statutes (strength of State role in local land use planning) in the Southern States, 1997

State	Description of State role		
	Strong	Significant	Weak
Alabama			X
Arkansas		X	
Florida	X		
Georgia	X		
Kentucky		X	
Louisiana			X
Mississippi		X	
North Carolina			X
Oklahoma			X
South Carolina		X	
Tennessee			X
Texas			X
Virginia			X

Source: American Planning Association 1999.

(Bernstein 1995). Local zoning codes divide the community into land use districts and establish building restrictions limiting the height, lot area coverage, and other dimensions of structures that are permitted to be built within each district depending on the degree of zoning authority granted to the local government. For example, counties with populations over 500,000 in Oklahoma are authorized to regulate building restrictions (height, number of stories, size of yards, and open spaces), population density, and location and use of buildings. Similarly, municipalities and counties in Mississippi are allowed to regulate the height of buildings and structures, the percentage of lots that may be occupied, open space, density of population, and the location and use of buildings.

Local governments have traditionally held the authority to make land use decisions because, in addition to being seen as more sensitive and responsive to local concerns, they are perceived as having more expertise in implementing fair and efficient land use policy. These local land use policies, however, often have the effect of increasing development and expanding the wildland-urban interface. Local governments receive most of their funding from property and sales taxes. They, therefore, have little reason to attempt to limit land development in their jurisdictions (see chapter 3). The desire to maximize property tax revenue sometimes results in overzoning for development by local governments. Many developing areas are highly overzoned for the amount of development they can expect in the foreseeable future. For instance, in Loudoun County, VA, current zoning allows between 50,000 and 53,000 new housing units to be built, even though current demand is running at about 3,000 units per year (Lindstrom 1997). Even when local governments attempt to limit growth, the policies they implement can have the indirect effect of increasing development in the interface. For example,

when local governments become alarmed about potential development impacts on available infrastructure, they often reduce allowable densities to levels supportable by private wells, septic tanks, and roads. The effect is to spread out settlement, causing more land to be developed. In Maryland, more than half of the development capacity allowed by local plans in 1996 was outside current or planned sewer service areas (Porter 1999). In another attempt to control growth, local governments sometimes implement restrictive zoning practices. However, by raising the entry costs for new residents and businesses and limiting undesirable land uses, localities direct would-be newcomers into undeveloped areas at the perimeter of the urban area (Lockard 2000). It is not yet fully understood what impact these developments may have on forest ecosystems and the goods and services they provide.

Public Attitudes and Involvement in Growth Management Policies

Property owners can contribute to natural resource problems in the interface because they do not always take into account the consequences their land use decisions may have on their neighbors. In addition, actions that are harmless in isolation can create serious problems when large numbers of people act in the same way (Freyfogle 1997). These two ideas came up repeatedly in the Assessment focus groups. Many participants saw private property rights as an important challenge for managing growth and conserving and managing natural resources. Others wanted to ensure that private property rights were respected and saw growth management tools, such as zoning, as a threat to these rights (Monroe

“I have the first place on the water that comes off of Piney Mountain, and I’m always so conscious of anything that I do impacting everyone else downstream, and I think there’s not enough of that. People need to be aware that what you do impacts so many other people.” Georgia

and others, in press). Despite the emphasis many landowners place on property rights, public attitudes towards land ownership are beginning to reflect a concern for natural resource protection. For example, a strong majority of private forest owners in the Tennessee Valley (all of Tennessee and portions of Mississippi, Alabama, Georgia, North Carolina, Virginia, and Kentucky) agreed with the statement that while private property rights are important, they are secondary to environmental protection and should be limited where necessary to protect the environment (Bliss and others 1997). The results of this survey signify that the public is becoming increasingly aware that the actions of individual landowners can significantly impact neighbors and the entire community.

Public attitudes also impact natural resource issues in the interface by influencing how these resources will be used. For example, individuals moving into the interface frequently are unfamiliar with forest management needs and often are intolerant of certain harvesting practices and changes in the appearance of the forest. Such new interface residents are more likely than their long-term, forest-production-oriented neighbors to favor zoning and logging regulations that place

limits on forestry operations, such as clearcutting, herbicide use, and prescribed fire (Bliss and others 1997). However, this dichotomy may be changing. A recent study on the environmental attitudes of forest owners in the Midsouth revealed that, to a large extent, the views of forest owners on key forestry and environmental issues were no different from those of nonowners. Both groups supported regulating forest-harvesting practices, even on private land, where necessary to protect the environment (Bliss and others 1997). These results suggest that in order to be responsive to the needs of forest owners in the interface, natural resource managers will require more environmentally sensitive approaches to forest management (see chapter 6).

Future Trends of Current Land-Related Policies

To a large extent, current land use policies have been ineffective in altering land use patterns and slowing the influx of people into the interface. Part of the reason why traditional land use control programs have had limited impact on interface development is that they were not designed for that purpose. The purpose of traditional zoning ordinances, for example, was to protect private property values and public investment in infrastructure by restricting neighboring landowners from using their land in a way that reduced property values or added cost to the community. In a survey of the most sprawl-threatened cities in the United States, 9 of the top 15 cities were in the South (Sierra Club 1998). A rapidly increasing human population in the South (see chapter 2) will result in further movement on to land in the interface as well as continued degradation of environmental resources (fig. 4.3). Increased human activity in the interface will also place greater stress on water supplies (see chapters 5 and 6). Water shortages in the South have already resulted in conflicts between several States, and total water withdrawals in the South are expected to increase by 40 percent between the years 2000 and 2045 (Kundell and Tetens 1998, Pringle 2000).

Current land use policies also have been unable to prevent the overlap of multiple Federal, State, and local jurisdictions over land use. As a result, various levels of government are making land use decisions independently of each other. Often these decisions are made without any common understanding of what long-range growth management goals separate government levels want to achieve and without an approach for addressing environmental issues that cross jurisdictional boundaries. Assessment focus group participants in Virginia suggested that current policy is “crying out for vision and clear direction and that there needs to be cooperation among agencies involved in the management of the interface” (Monroe and others, in press). The current system encourages private landowners to make land use decisions that are in their own short-term best interest without regard for whether these decisions will be beneficial to the broader community.



Photo by James Kundell, University of Georgia

Figure 4.3
Rapid development leads to the fragmentation and loss of forest land in growing areas.

“There is no empowerment of regional planning because there are so many local municipal governments. There is fragmentation, an imbalance of power, and a lack of coordination.” Texas

Tools for Protecting Natural Resources Within the Interface

Technologies

Increasingly, innovative ways are being found to use Geographic Information Systems (GIS) to aid in land use planning in the interface. For instance, CITYgreen is a GIS application developed by the nonprofit organization, American Forests. It allows users to calculate the environmental and economic benefits of forests and trees. CITYgreen is used by planners and policymakers to map and measure tree-cover changes (see chapter 5) and to calculate the benefits urban trees and forests provide, including reduced stormwater runoff, energy savings, carbon sequestration, and the removal of pollutants. CITYgreen is part of a method of land assessment used by American Forests called Regional Ecosystem Analysis (REA). Regional Ecosystem Analysis measures a region's or city's tree canopy and calculates its economic worth. For example, an REA conducted in Austin, TX, found that if canopy coverage in the city was increased to match that of the best canopied sample site, annual carbon sequestration would increase from 5,700 to 10,000 tons, and the annual value of that sequestration would increase from \$5.3 million to \$9.2 million (American Forests 2000) (see chapter 6).

Geographic Information System technology can also be used to analyze land use trends. The Georgia Land Use Trend Project (GLUT) was instituted to produce landcover maps based on satellite data for Georgia from 1973–98, and to analyze rates of change in landcover during this 25-year period. The GLUT provides information on the impact of changing land use on the State's natural resources as well as the relationship between land use activities and water quality. This information allows resource managers, planners, local officials, developers, nonprofit organizations, and other stakeholders to incorporate the needs of resource management into their land use decisions (Wexler 2000).

Local governments can also benefit from computer technology when making land management decisions. The Land Capacity Model is an example of a computer program designed to allow the user to forecast the effects of a continuation of recent development trends or to project the effect of possible changes in existing trends (Dahlstrom 1997). Likewise, the California Urban Futures Model (CUF Model) uses GIS for data integration and spatial analysis to examine the environmental impacts associated with different potential development policies (Landis 1995). In this way, land use models can provide local government planners with the information they need to determine where growth can be accommodated without sacrificing environmentally sensitive land.

Land-Related Policies

Local governments are using a number of programs and policies to guide and control growth in the interface. These growth management measures include such policies as:

Smart growth programs—This term includes a range of approaches to contain development by using more efficient and compact urban development patterns, such as urban growth boundaries that preserve open space and protect environmentally sensitive areas.

Alternative zoning ordinances—These can be used to protect forests, wetlands, floodplains, or environmentally sensitive land (fig. 4.4). There are several different forms of alternative zoning ordinances:

- ◆ **Floating zones**—A floating zone is a specialized use district that floats over an entire jurisdiction until it attaches to a specific property upon the request of the owner who must demonstrate that a variety of impacts will be properly handled, such as the project's effect on natural resources and preservation of open space.
- ◆ **Overlay zones**—An overlay zone supplements the underlying zoning standards with additional requirements that can be designed to protect the natural features in an important environmental area.
- ◆ **Cluster development**—A cluster development is a subdivision in which the applicable zoning ordinance allows or requires development to be placed on a portion of the parcel and the rest to remain undeveloped open space.
- ◆ **Incentive zones**—Incentive zones are significant waivers of zoning requirements offered to developers as a method of directing larger scale development into designated growth areas.
- ◆ **Impact fees**—In order to pay for development and not impact current residents, local governments have implemented impact fees as a mechanism for assigning a share of the new required public service infrastructure to new owners of developed property.

Transferable development rights (TDR)—Under a TDR program, a landowner is assigned rights to develop which cannot be used on sensitive land but can be transferred to other land or sold to other developers.

Purchase of development rights (PDR)—Under a PDR program, landowners can volunteer to sell the development rights to their land to the Federal, State, or local government or a nonprofit group while retaining ownership of the land. The current and future owners of the land are restricted from development activities.

Conservation easements—Conservation easements that permanently restrict the use of a particular tract of land can be purchased by Federal, State, or local agencies or by private groups.

Priority funding areas (PFA)—PFAs control growth by limiting State support for growth-related projects such as sewer and water systems to locally designated growth areas. Maryland has implemented PFAs since 1998 (American Planning Association 1999).

Open-space preservation—Open, or green, space is defined as agricultural and forestry land in a natural state or land developed only to the extent consistent with the protection of the environment (Urban Land Institute 1999) (fig. 4.5). Many State conservation programs include open-space preservation as part of the State's overall policy to preserve land. For example, Georgia recently created a Greenspace Trust Fund with the goal of ultimately preserving 20 percent of Georgia's land area as open space (Griffith 2000).

Land trusts—In addition to Federal and State land conservation programs and policies, there are over 1,000 land trusts currently operating at the local and regional levels in the United States, protecting over 4 million acres of land through voluntary land transactions (Wiebe and others 1997).



Figure 4.4
Alternative zoning techniques provide greater flexibility than traditional zoning and allow planners to design developments that better fit the land and to set aside more green space.



Photo by Annie Hermansen, USDA Forest Service

Figure 4.5
Many local governments are acquiring green space as part of their conservation programs.

Examples include The Nature Conservancy, which currently protects more than 11 million acres in the United States, and The Trust for Public Land, which protects more than 1.2 million acres in 45 States (The Nature Conservancy 1999, The Trust for Public Land 2000).

The following tabulation shows Southern State acreage that is protected by The Nature Conservancy:

State	Area protected Acres
Alabama	101,000
Arkansas	230,000
Florida	920,000
Georgia	200,000
Louisiana	205,000
Mississippi	106,578
North Carolina	457,154
Oklahoma	84,000
South Carolina	165,198
Tennessee	93,000
Texas	473,000
Virginia	200,000
Total	3,234,930

Needs

Research needs to be conducted to better define natural resource management issues in the interface and their relationship to land use policies. Analysis should focus on the following areas:

- ◆ Public policies toward land use and the influence of subsequent land uses on natural resources.
- ◆ The role land use policies play in managing growth in both rural areas, which may lack many land use policies, and more suburban areas where land use policies are in place but may or may not be effective in controlling growth in the interface.
- ◆ Weaknesses in land use policies as well as options that are available to better address natural resource management and conservation issues in the interface.
- ◆ Public support for land protection and how much people are willing to pay for land protection. For example, one recent survey of Chicago suburbanites revealed that residents were willing to pay \$484 per year for 5 years to permanently protect about 20,000 acres of farmland in their county from development (American Farmland Trust Center for Agriculture in the Environment 1997).
- ◆ The value of strategically using forests to offset some of the negative environmental consequences of urbanization and changing land use patterns in interface and urban areas.

- ◆ Approaches to planning that have worked in other areas.

Natural resource managers and local planning officials need to understand the role each plays in protecting natural resources in the interface. In particular, natural resource managers need to better understand and influence public policies related to natural resources. Natural resource managers can do the following:

- ◆ Help adjacent communities and private landowners understand ecological systems so that they can make their planning and development decisions in an informed, science-based manner.
- ◆ Initiate communication with planners and developers by responding to requests for comments or participation by local communities and by paying closer attention to the goals and effects of the local planning process.
- ◆ Conduct environmental outreach by communicating with key audiences at the local, regional, State, and national levels. Natural resource managers need to make messages easily understood by the public.
- ◆ Engage the public to establish mutual understanding, promote involvement, and influence attitudes and actions in order to foster joint stewardship of natural resources.

To best address natural resource and conservation issues in the interface, the appropriate level of government needs to have the authority to deal with issues on the most suitable scale. Scaling requires an awareness of individual changes, an understanding of what the changes mean in terms of natural resources and environmental quality, and an ability to determine whether the rate of change is acceptable. Each level of government has a role to play in controlling the rate of change in the interface.

The Federal Government can provide:

- ◆ Research,
- ◆ Technical assistance, and
- ◆ Management of public lands and natural resources.

State governments can provide:

- ◆ Research;
- ◆ Monitoring, compliance, and enforcement;
- ◆ Oversight of local programs (including funding);
- ◆ Training and technical assistance to local governments; and
- ◆ Management of State land and natural resources.

Local governments can provide:

- ◆ Infrastructure and program funding,
- ◆ Land use planning and regulation, and
- ◆ Management of lands of local interest.

There is also a need to encourage cooperation and collaboration when dealing with multijurisdictional natural resource issues (see chapter 7). As long as cities and counties differ in their visions of how development should proceed, developers will be able to shop for lenient forums and make decisions that yield the highest profits. Growth management issues are often best addressed at a regional level, especially around large metropolitan areas with multiple local governments. In some cases, regional cooperation can be encouraged by State policies.

The current lack of reliable natural resource information on critical wildlife habitats, aquifers, and other environmental quality indicators also needs to be addressed. In the absence of relevant scientific and technical data, environmental needs cannot be prioritized and long-term threats may not be identified. The technology to conduct this research, such as GIS, satellite imaging, and computer systems, is currently available. However, it is not presently being used enough for these purposes. In order to address this information deficit, natural resource managers need to:

- ◆ Correlate natural resource information with demographic and land use change data;
- ◆ Collect more GIS data from more communities;
- ◆ Project growth and estimate the impact of that growth on natural resources; and
- ◆ Establish sound, interdisciplinary research to serve the needs of policy-makers.

“I think we need a lot more information about the transition, how you protect your environment and forests in a transition from rural to urban.” Virginia

The land use policies discussed above, such as TDRs, conservation easements, and alternative zoning, when implemented at the State and local levels, can improve natural resource management and conservation in the interface. Natural resource managers and the public, as well as State and local officials, need to become both more aware that these land use policies exist and be more willing to put them into practice.

One of the most important roles natural resource managers can play in affecting policy change is in educating the public about the value of natural resources and conservation in the interface. Natural resource managers can:

- ◆ Encourage those who live in the interface to become aware of their connection to the forest and of their responsibility to assist with its stewardship. For example, many people do not understand the importance that watersheds have in supplying clean water to communities. Consequently, they do not actively assist managers in ensuring that watersheds are sustainably managed.
- ◆ Conduct educational programs to increase the perceived legitimacy of specific natural resource measures.

- ◆ Distribute information over the Internet through use of Web sites aimed at the general public.
- ◆ Help stakeholders develop a consensus about what the interface community should look like in the future. Such visions should, in turn, be reflected in local ordinances.
- ◆ Integrate stakeholders into natural resource decisionmaking. Land and resource planning must provide mechanisms for dialogues that are open to any person. Ideas should be expressed in nontechnical terms that are readily understandable to the general public. The participation of citizens should be encouraged from the beginning and be maintained throughout the planning process.

“There is a huge lack of understanding, knowledge, and appreciation of the valuable rural and forest assets that are here. They’re just taken for granted, both rivers and forests.” Mississippi

It is important for natural resource managers to remember that without broad-based public understanding and support, land use policies cannot conserve and protect natural resources in the interface.

Conclusion

Risks to natural resources and conflicting interests of stakeholders make urban development in the interface a most difficult problem for natural resource managers. The underlying policy issues need to be addressed by the public as well as elected officials if natural resources in the interface are to be preserved. Natural resource managers can play an important role in raising public awareness of the natural resource and conservation issues in the interface. Too often communities wait until development has begun before attempting to revise their land development plans. By then, emotions are often running high, and anger, divisiveness, and resentment preclude rational discussion about the long-term goals of the community. Because these issues are multifaceted, proactive and flexible land use policies are needed to deal with them. Fortunately, such policies exist, and communities across the South are implementing them. However, much more still needs to be done to assure natural resource protection in the interface.

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